

Report No. 372833-01

Test Report

Product	Wireless Antenna for Wireless Microphones				
	Wireless Antenna for Wireless Microphones				
Name and address of the applicant	Panasonic Corporation of North America Two Riverfront Plaza, 9 th Floor Newark, NJ 07102-5490, USA				
Name and address of the manufacturer	Same as above				
Model	WX-SA250P				
Rating	24V _{DC} (Supplied from)				
Trademark	Panasonic				
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 Services (LE-PCS) Devices				
Order number	372833				
Tested in period	2019-04-11 to 2019-05-21				
Issue date	2019-05-28				
Name and address of the testing laboratory	Institutiveien 6 CAB Number: Kjeller, Norway TEL: +47 22 96 03 30 TEL: +47 22 96 05 50 Construction An accredited technical test executed under the Norwegian accreditation scheme				
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Template version: D



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1 INFORMATION

1.1 Tested Item

Name	Panasonic		
Model name	WX-SA250P		
FCC ID	ACJ9TAWX-SA250P		
ISED ID	216A-WXSA250P		
Serial number	/		
Hardware identity and/or version	ES2		
Software identity and/or version Main BBIC: v0.00R04 Sub BBIC: v0.00R02			
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	78 mW (Peak)		
Antenna Connector	None (Integral Antennas)		
Number of Antennas	2		
Antenna Diversity	Yes		
Desktop Charger	N/A		
Power Supply	Power supplied from Wireless Receiver (WX-SR202)		
Interfaces	Proprietary Interface to Wireless Receiver (WX-SR202)		

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.



1.3 Test Conditions

Temperature:	20 – 23 °C
Relative humidity:	30 – 50 %
Normal test voltage:	24 V DC (Nominal Voltage)

The values are the limit registered during the test period. All tests except monitoring tests were performed with the EUT supplied from an external power supply powered with 120V 60Hz.

Monitoring Tests were performed with the EUT supplied from the supplied Wireless Receiver (WX-SR202).

1.4 Test Engineer(s)

Frode Sveinsen / Thomas Danglé

1.5 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), RSS-213 Issue 3, clause 5.1:

All transmissions must use only digital modulation techniques.

1.6 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.

1.7 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 were performed on a sample with a temporary antenna connector.

Requirement: FCC 15.203, 15.204, 15.317, RSS-GEN Issue 5, clause 6.8



1.8 Channel Frequencies

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, RSS-213 Issue 3, clause 5.1:

Within 1920 -1930 MHz band for isochronous devices.

1.9 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 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 Industry 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.

☑ New Submission

Production Unit

□ Class II Permissive Change

Pre-production Unit

PUB 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)	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	Complies
Emission Bandwidth	15.323(a)	5.5	Complies
Occupied Bandwidth	N/A	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
Peak Transmit 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 (2)(5)(9)	Complies
Monitoring of intended transmit window and maximum reaction time	15.323(c)(1)	5.2 (1)	Complies
Threshold monitoring bandwidth	15.323(c)(7)	5.2 (7)	Complies
Reaction time and monitoring interval	15.323(c)(1)(5)(7)	5.2 (1)(5)(7)	Complies
Access criteria test interval	15.323(c)(4)(6)	5.2 (4)(6)	Complies
Access Criteria functional test	15.323(c)(4)(6)	5.2 (4)(6)	Complies
Acknowledgements	15.323(c)(4)	5.2 (4)	Complies
Transmission duration	15.323(c)(3)	5.2 (3)	N/A ¹
Dual access criteria	15.323(c)(10)	5.2 (10)	N/A ¹
Alterative monitoring interval	15.323(c)(11)(12)	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 equipment that transmits unacknowledged control and signaling information

¹ Only applies for EUT that can be initiating device

 $^{\rm 2}$ 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

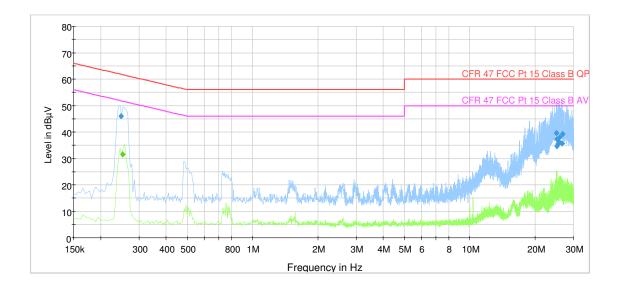
ISED RSS-213 Issue 3, Clause 6.3; RSS-GEN Issue 5, Clause 7.2 / 8.8

Measurement procedure:	ANSI C63.4-2014 using 50 $\mu\text{H}/\text{50}$ ohms LISN
Test Results:	Complies
Measurement Data:	See attached plots

Highest measured value (L1 and N):

EUT Powered from WX-SR202, 120V 60Hz

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.248	45.96		61.82	15.86	1000	9	Ν	OFF
0.252		31.50	51.69	20.19	1000	9	L1	OFF
25.032	39.67		60.00	20.33	1000	9	N	OFF
25.176	34.68		60.00	25.32	1000	9	N	OFF
25.224	37.24		60.00	22.76	1000	9	L1	OFF
25.480	35.53		60.00	24.47	1000	9	L1	OFF
25.688	36.26		60.00	23.74	1000	9	L1	OFF
25.876	37.91		60.00	22.10	1000	9	L1	OFF
26.524	35.57		60.00	24.43	1000	9	Ν	OFF
26.716	39.10		60.00	20.90	1000	9	L1	OFF





3.2 Automatic Discontinuation of Transmission

Does the EUT transmit Contro			
TYPE OF EUT :		☑ 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	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 have no On/Off switch. Hook-On is not supported by either device)

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.



3.3 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	18.78	2.95*	21.73			
2	1924.992	18.90	2.95*	21.85			
0	1928.448	18.75	2.95*	21.70			

*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 µW x SQRT(<i>B</i>)	where B is the measured Emission Bandwidth in Hz
FCC 15.319(c)(e):	20.75 dBm (119 mW)
ISED RSS-213, Issue 3:	20.43 dBm (110 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 📑	Spectrum	× Spectrur	m 2 🗙	Spectrum 3	× Spectr	um 4 🗙			-
	.00 dBm Offse								
 Att TRG:RFP(8GHz 	20 dB 😑 SWT	500 µs 🛛 V	BW 10 MHz						
1 Zero Span	1	1							●1Pk Max
								M1	1] 18.78 dBm
	M1								6.000 µs
20 dBm									
	/								
10 dBm									
0 dBm									
o ubiii									
-10 dBm									
-20 dBm									
-30 dBm									
Mannamul								L	and many make
-40 dBm									
-50 dBm					<u> </u>				
JU UDIT									
-60 dBm									
I _									
CF 1.921536 C				100	l pts				50.0 µs/
							Measuring		12.04.2019

Lower Channel

Zero Span						o1Pk Ma⊁
20 dBm	M1				M1[1] 18.75 dB 7.000 j
		 	-			
0 dBm						
dBm						
10 dBm						
20 dBm						
30 dBm						
му.//ww./ИА/////// 40 dBm	4				hu	Muddhamand
+0 UBIII						
50 dBm						

Upper Channel



Att	0.00 dBm Of 20 dB • SV		VBW 10 MHz				
TRG:RFP(8GH Zero Span	lz)						o1Pk Max
						M1	[1] 18.90 dBi 6.000 µ
20 dBm	M1	~					0.000
0 dBm							
, dp.,.							
dBm							
10 dBm	_						
20 dBm							+
30 dBm							
non an	J.					, i	hand
40 dBm							
50 dBm							+
co dan							
60 dBm							
	TRG GHz			01 pts			50.0 µ

Middle Channel



3.4 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	1.41
0	1928.448	1.42

Channel No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)
2	1924.992	1.22

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	Spectrum	Sp	ectrum 2	× Spect	rum 3 🛛 🔉	3			•
Ref Level 30).00 dBm Offse	et 10.40 dB 🖷 RI	3W 30 kHz						
🖷 Att	20 dB SWT	1.04 ms VE	3W 100 kHz N	Mode Sweep					
1 Frequency S	Sweep								●1Pk Max
								M1[1]	17.33 dBm
				Ν	11			1.	92153600 GHz
20 dBm					X.				
				mm					
10 dBm			~	f mar in	V	~~ <u>~</u>			
0 dBm									
			n∕^			72			
-10 dBm			7			٧			
-10 000								\land	
		rm/						\sim \	
-20 dBm	~~~							M.	
		V					v	- m	
-30 dBm	1								
	1								h
-40 dBm									$ \neg \neg \land$
\sim									1 m r
-50 dBm									
oo abiii									
-60 dBm	1								
CF 1.921536	GHz		1001 pt	ts	36	0.0 kHz/			Span 3.6 MHz
2 Marker Tab									
Type Re	f Trc	X-Value		Y-Value		Function		Function Re	esult
M1	1	1.921536 G		17.33 dBm	ndB			26.0	dB
T1	1	1.9208239		-8.86 dBm	ndB down	ЗW		1.41 MH	
T2	1	1.9222373 0	JHZ	-8.74 dBm	Q Factor			1359	
							Measuring		12.04.2019 14:57:57

MultiVie	ew 🎫 Spectrun	n 🗙 Spe	ctrum 2	× Spect	rum 3 🛛 🗙				
RefLev	el 30.00 dBm Offs	et 10.40 dB 🖷 RBV	N 30 kHz						
Att	20 dB SWT	1.04 ms VBV	V 100 kHz	Mode Sweep					
1 Freque	ncy Sweep								o1Pk Max
								M1[1]	17.20 dBm
					1			1.	92844800 GHz
20 dBm									
10 dBm			~^\	han	C OWN	hry			
			~~			m			
0 dBm									
		πι	ſ .			Δ τ2			
-10 dBm		f	, 			7			
10 0011							1	\land	
00.40		prin /						ργ (
-20 dBm	~~							M,	
	1	V						m.	
-30 dBm	~							7	
	Λ								
-40 dBm	<u> </u>								man A
and a									$\sim $ $\sim $
-50 dBm									
-60 dBm									
-00 0811									
CF 1.9284	448 GHz	1 1	1001 p	ts	36	0.0 kHz/	1		Span 3.6 MHz
2 Marker	Table								
Туре	Ref Trc	X-Value		Y-Value		Function		Function Re	
M1	1	1.928448 GH		17.20 dBm	ndB			26.0 (dB
T1 T2	1	1.9277287 GH 1.9291493 GH		-8.59 dBm -8.85 dBm	ndB down B O Factor	3VV		1.42 MH 1357	
	1	1.9291493 GF	12	-o.oJ uDIII	Q Factor				10.01.0010
							Measuring	REF	12.04.2019 15:01:00

Emission Bandwidth B, Upper Channel

Emission Bandwidth B, Lower Channel



🕨 Att	20 dB SWT	1.04 ms VBW	100 kHz M	ode Sweep					
I Occupied E	Bandwidth	1		P			I		●1Pk Ma>
								M1[1]	17.27 dB 92499200 GF
20 dBm				M	1			1.	92499200 G
				~ (
0 dBm			~~~	man	WWWWW	<u>~</u>			
			цул —			\mathcal{M}_{5}			
) dBm	-	l .	A.			5			
						5			
10 dBm	-	+ A-							
	A I	-					1 mm	L/\	
20 dBm		<u> </u>					H	- m	
	J. J.							N.	
30 dBm	- wat								
1									\sim
40 dBm									
$\int f = \int f $									~
50 dBm		1 1							
-60 dBm		1 1							
F 1.924992	2 GHz	1	1001 pt	5	36	0.0 kHz/			Span 3.6 Mł
Marker Ta									
	ef Trc	X-Value 1.924992 GH	, 4	Y-Value 7.27 dBm	One Buy	Function		Function Re 1.2173382	
M1 T1	1	1.92437306 GH:		-0.29 dBm	Occ Bw Occ Bw Cer	atroid			52 MITZ 1731 GHz
T2	1	1.9255904 GH		1.87 dBm	Occ Bw Fre			-10.26949	

99% Bandwidth, Middle Channel



3.5 **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/3kHz)
4	1921.536	-3.9
0	1928.448	-3.8

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.



Lower Channel:

MultiView 🎫 Sp	ectrum 🗙	Spectrum 2	×					•
Ref Level 10.00 dBr	n Offset	10.40 dB • RBW 3 kl	Hz					
● Att 20 d	B SWT 1.4 ms ((~10 ms) VBW 10 kl	Hz Mode Auto	FFT				
1 Frequency Sweep								o1Pk Max
0 dBm	×	way was a way way was a way wa	mound	My when	mmym	nh here phi	M1[1] 1.	5.61 dBm 92154350 GHz
-10 dBm	www.	V~~ _ ~				Q * * * * *	mmun	M_
-28 dBm								Mary
								h h
-30 dBm								
-40 dBm								
-50 dBm								
-60 dBm								
-70 dBm								
-80 dBm								
CF 1.921536 GHz		1001 pts	5	1.5	50.0 kHz/	1		Span 1.5 MHz
· ·		1001 pt	-		, olo lu iLy ▽	Measuring		44 12.04.2019 15:10:01

PSD Overview

MultiView	Spectrum	× Sp	ectrum 2	× Spect	rum 3 🛛 🗙	(•
Ref Level 10	0.00 dBm Offse	et 10.40 dB 🖷 R	BW 3 kHz						
Att	20 dB 🖷 SWT	1 ms V	BW 10 kHz					Cou	nt 1000/1000
TRG:VID 1 Time Domai	n Power								o1Sa Avg
								M1[:	
		M1							 244.000 μs
0 dBm									
-10 dBm	ſ								
-20 dBm									
	-TRG -29.000 dBm -								
-30 dBm	-1KG -29,000 UBIII								
-40 dBm									
-50 dBm									
-60 dBm									
									$\langle \rangle$
-70 dBm									
-80 dBm							_		
\$1									
CF 1.9215435				100	1 pts				100.0 µs/
2 Marker Tab									
Type Re M1	f Trc	X-Value 244.0 µs		Y-Value 1.05 dBm	TD Pow RM	Function		Function Re -3.87 dB	esult m
INIT	-	244.0 μ3			TO POW RM				12.04.2019
							Measuring		15:11:42

PSD Averaged, 1000 Sweeps



Upper Channel:

MultiView	Spectrum	× s	pectrum 2	× Spectr	um 3 🛛 🗙	٢			•
Ref Level 10.0	00 dBm Offse	t 10.40	dB e RBW 3 k	Hz					
🖷 Att	20 dB SWT	1.4 ms (~10 i	ms) VBW 10 k	Hz Mode Auto	FFT				
1 Frequency Sv	veep								o1Pk Max
0 dBm		, m	man	MMMM	The month	whiman			5.84 dBm 92845550 GHz
	Marmon	MMM .	mummall	ч ,	w.			www.www.Mm	
and month									my
-20 dBm									- N
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
CF 1.928448 GH			1001 ===		15	50.0 kHz/			Coop 1 E Mila
			1001 pt	5	15			ST-0	Span 1.5 MHz 12.04.2019
							Measuring	REF	15:13:13

PSD Overview

RG:VID Time Domain Powei		VBW 10 kHz					o 1Sa Avg
	M1					M1[1	
dBm							
0 dBm							
0 dBm TRG -29.	000 dBm						
0 dBm							
0 dBm							
0 dBm							
0 dBm							
0 dBm						•	
1.9284555 GHz			1001 p	ots			100.0 µ

PSD Averaged, 1000 Sweeps



3.6 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 $2B < f \le 3B$: at least 50 dB below max. permitted peak power $3B < f \le$ UPCS Band Edge : at least 60 dB below max. permitted peak power

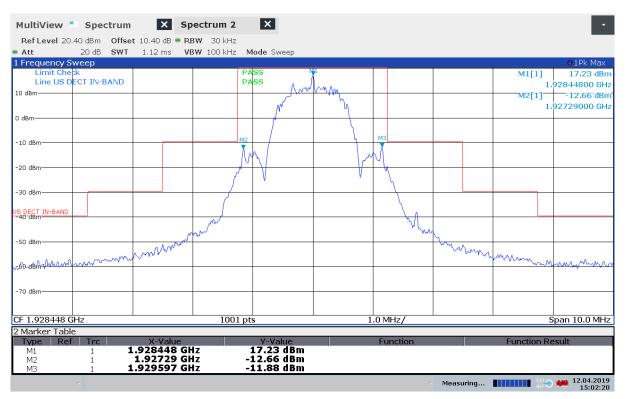
MultiView	Spec	trum	×	Spe	ctrum 2		×					•
Ref Level 20	.40 dBm	Offset	10.40 dB	● RB¥	V 30 kHz							
Att		SWT	1.12 ms	VBW	V 100 kHz	Mode	e Sweep					
1 Frequency S												●1Pk Max
Limit Che						PASS	P	1			M1[1]	17.26 dBm
Line US D	ECT IN-B	AND				PASS	AM	WAM.			1	92499200 GHz
10 dBm							N V	X. V.M			M2[1]	-12,45 dBm
							N	М			1	92383300 GHz
0 dBm						_						
						42			мз			
-10 dBm						12 Y	1		X			
						NAM.	1	M	\uparrow			
-20 dBm						μĄ		\downarrow	- h			
							1	•	h h			
-30 dBm					/							
					1				Ι <u></u>			
US DECT IN-BAND									1			
					m				Why			
				an M	M				M.W.	A. I		
-50 dBm			Mad	V. C.						Mr. A.	mann	
		a. mot	mary							1 me hanh	mars.	
460/dBm+444-1-00	Marin	AAber a				_					" ~ vww	man
ľ												
-70 dBm												
-70 080												
CF 1.924992 0	Hz				1001	pts		1	.0 MHz/	1		Span 10.0 MHz
2 Marker Tabl	e											
Type Ref	Trc		X-Valu				'-Value		Function		Function R	esult
M1	1	1	.924992	GHZ		17	.26 dBm					
M2	1		.923833 .926141			-12	.45 dBm .76 dBm					
M3	1	1	.920141	. GHZ		-11	.79 abil)					
										Measuring	EXT	12.04.2019 15:03:06

In-Band Emissions, Middle Channel



MultiView	Spec	trum	×	Spe	ctrum 2	×							•
Ref Level 20	.40 dBm	Offset	10.40 dB	• RBW	/ 30 kHz								
Att	20 dB	SWT	1.12 ms	VBW	/ 100 kHz	Mode Sweep							
1 Frequency S													o1Pk Max
Limit Che						PASS	No.					M1[1]	17.28 dBm
Line US D	ECT IN-B	SAND				PASS	mmm						1.92153600 GHz
10 dBm						N	No and Mar Ard					M2[1	-12,52 dBm
						N	<u>م</u>						1.92037700 GHz
0 dBm													
						M2			мз				
-10 dBm						M2			Y				
						Mr. I		M	\mathbb{N}				
-20 dBm													
						V		v	۲. The second				
-30 dBm													
					ľ								
US DECT IN-BAND									5.0				
-40 0811					w				Mh				
				a www	N				· · · ·	Δ.			
-50 dBm				~						WW	0		Mannananana
Δ. Δο	mm	mm	Mrow .								2 WWW	mon	
1760 dBm	white is												- manage and a start of the
-40 dBm -50 dBm A-60 dBm-Mr													
-70 dBm													
CF 1.921536 G	 				1001	nto		1	.0 MHz/				Span 10.0 MHz
2 Marker Tabl					1001	pts		1					
Type Ref		_	X-Valu	ie		Y-Value			Function			Function	Result
M1	1		.921530	5 GHz		17.28 dB			- unodon			i ancton	1.000 mc
M2	1		.920377			-12.52 dB							
M3	1	1	.922684	4 GHz		-11.83 dB	m						
										Measu	ring		12.04.2019

In-Band Emissions, Lower Channel



In-Band Emissions, 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 bar	nd :≤ -29.5 dBm
$f \ge 2.5$ MHz outside UPCS band :	≤ -39.5 dBm

Out-of-Band Emissions, Conducted

Lower Channel:

MultiView	Spec	trum							•
Ref Level 10	.00 dBm	Offset 10.40 dB • RI	BW 30 kHz						
Att	20 dB	SWT 7.78 ms VI	3W 100 kHz M	lode Sweep					
1 Frequency S									•1Pk Max
Limit Che				SS				M1[1]	-40.93 dBm
Line US D	ECT OUT-	OF-BAND	PA	SS				1	.9199650 GHz
0 dBm								M2[1]	-52.53 dBm
								1	.9111540 GHz
-10 dBm									
-20 dBm									
-30 dBm									
-30 ubm									
									M1
US DEEM OUT-OF-I	AND								
									/
-50 dBm							1913	M2	
							Ţ	44.	N
-60 dBm								pur_	MARAN
		where where the manufacture where the manufa	due a herma	new the new work	Mar in water	maburman	AN WARMAN	many w	www.wayayan
-70 dBm	MANNOVANA	and the second and a second second	Www. J. Ward March and Mar	No	All and designed and a set	. p			
-70 dBm-									
-80 dBm									
1.85 GHz			1001 pt		7	.0 MHz/			1.92 GHz
2 Marker Tabl	-		1001 pt	3	/				1.92 002
Type Ref		X-Value		Y-Value		Function		Function Re	sult
M1	1	1.919965 GI	1z -4	40.93 dBm		- ancion		7 unction i i i	Joant
M2	ī	1.911154 GI		52.53 dBm					
M3	1	1.900804 Gł	lz -!	54.33 dBm					
							Measuring		12.04.2019

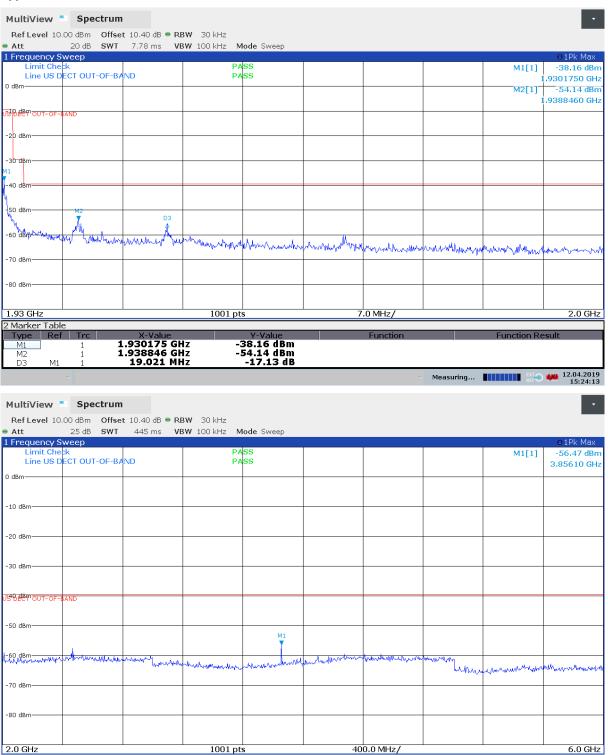


Lower Channel:

Multi	View	Spectrum	1							•
Ref L	.evel 10	.00 dBm Offse	t 10.40 dB 🖷 RE	30 kHz						
 Att 			94.5 ms VB	3 W 100 kHz N	lode Sweep					
	uency S imit Che			PA	SS				M1[1]	• 1Pk Max -59.86 dBm
		ECT OUT-OF-BA	ND		ss				initial initia	1.838540 GHz
0 dBm—										
-10 dBm	1									
00 d0m										
-20 dBm										
-30 dBm	1									
US ⁴ BEEP	OUT-OF-I	SAND								
-50 dBm	1 <u> </u>									
-60 dBm	1 <u> </u>									M1
<mark>₩~₩₩₩</mark> ₩ -70 dBm	Marthan Jan	um what any a	mound ber marendes	Mahlu kon anna	halamananthan	howhather and	manshandhad	Marchard March	ad parahamph	Minhahahahah What
-70 UBN	1									
-80 dBm	ı———									
1.0 Gł	Ηz			1001 pt	s	8	5.0 MHz/			1.85 GHz
		~					~	Measuring		12.04.2019 15:22:46
										13.22.40
Multi	View	Spectrum	1							•
	View	-		SW 30 kHz						•
		-	t 10.40 dB 🖷 RE	3₩ 30 kHz 3₩ 100 kHz №	lode Sweep					•
Ref L • Att 1 Freq	evel 10	.00 dBm Offse 20 dB SWT weep	t 10.40 dB 🖷 RE	3W 100 kHz N						• o 1Pk Max
Ref L Att <u>1 Freq</u>	evel 10 uency S imit Che	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att <u>1 Freq</u> L	evel 10 uency S imit Che	.00 dBm Offse 20 dB SWT weep	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M					M1[1]	
Ref L Att <u>1 Freq</u>	evel 10 uency S imit Che	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm-	Level 10 Uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att <u>1 Freq</u> L	Level 10 Uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm-	Level 10 Uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm-	Level 10 uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm- -10 dBm	Level 10 uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm- -10 dBm	Level 10 uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att I Freq L 0 dBm- -10 dBm	Level 10 uency S imit Che ine US D	.00 dBm Offse 20 dB SWT weep ok	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att I Freq C 0 dBm -10 dBm -20 dBm -30 dBm	Level 10 uency S imit Che ine US D	00 dBm Offse 20 dB SWT weep 5k ECT OUT-OF-BA	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att I Freq C 0 dBm -10 dBm -20 dBm -30 dBm	Level 10 uency S imit Che ine US D	00 dBm Offse 20 dB SWT weep 5k ECT OUT-OF-BA	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm— -10 dBm -20 dBm -30 dBm US ⁴ DE ^B Y	evel 10 uency S imit Che ine US D	00 dBm Offse 20 dB SWT weep 5k ECT OUT-OF-BA	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att I Freq C 0 dBm -10 dBm -20 dBm -30 dBm	evel 10 uency S imit Che ine US D	00 dBm Offse 20 dB SWT weep 5k ECT OUT-OF-BA	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS				M1[1]	-61.05 dBm
Ref L Att 1 Freq L C dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm	evel 10 uency S imit Che ine US D	00 dBm Offse 20 dB SWT weep 5k ECT OUT-OF-BA	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS	M1			M1[1]	-61.05 dBm
Ref L Att 1 Freq L 0 dBm— -10 dBm -20 dBm -30 dBm US ⁴ DE ^B Y	evel 10 uency S imit Che ine US D	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	SS SS	M1				-61.05 dBm 547.530 MHz
Ref L Att 1 Freq L C dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm	evel 10 uency S imit Che ine US D	00 dBm Offse 20 dB SWT weep 5k ECT OUT-OF-BA	t 10.40 dB ● RE 110 ms VE	SW 100 kHz M	SS SS	M1 W1			M1[1]	-61.05 dBm
Ref L ■ Att 1 Freq L L 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm	evel 10 uency S imit Che ine US D	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	SS SS					-61.05 dBm 547.530 MHz
Ref L Att 1 Freq L C dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm	evel 10 uency S imit Che ine US D	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	SS SS			may protection of the second		-61.05 dBm 547.530 MHz
Ref L ■ Att 1 Freq L L 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm	-evel 10 Uency S imit Che ine US D 	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	SS SS			may protection of the second		-61.05 dBm 547.530 MHz
Ref L Att 1 Freq L 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm (-70 dBm	-evel 10 Uency S imit Che ine US D 	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	SS SS			may make way		-61.05 dBm 547.530 MHz
Ref L Att 1 Freq L 0 dBm- -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -50 dBm -80 dBm	evel 10 Uency S imit Che ine US D 	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	SS SS	unnum unnum		may make and		-61.05 dBm 547.530 MHz
Ref L Att 1 Freq L 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm L 70 dBm	evel 10 Uency S imit Che ine US D 	AND	t 10.40 dB • Re 110 ms VB	W 100 kHz M PA PA	Astronomic and a state of the s	unnum unnum				-61.05 dBm 547.530 MHz



Upper Channel:



Measuring... 12.04.2019



Upper Channel:

MultiView	Spectrum	1							•
Ref Level 10	0.00 dBm Offse	t 10.40 dB 🖷 RB	30 kHz						
Att		667 ms VB	3W 100 kHz M	lode Sweep					
1 Frequency 9			PA	SS				M1517	O 1Pk Max
	DECT OUT-OF-B	ND	PA					M1[1]	-60.02 dBm 11.97900 GHz
0 dBm									11157 500 6112
-10 dBm									
-20 dBm									
-30 dBm									
-30 0611									
UST DEEM OUT-OF	BAND								
-50 dBm									
									M1
-60 dBm-	in new up routin	mounderal	MARK WARAN	armont	Marsh man durante in	not share to she is a first	un han adulted	and marken man	Mannamont
Marrana	halfs and the same is a	La balito vito vota a continued	t more Mr. Mail and all	www.week		a na tha an tha tha tha tha tha tha tha	and a solution		Ť
-70 dBm									
-80 dBm									
-80 UBM									
6.0 GHz			1001 pt	s	60	0.0 MHz/			12.0 GHz
	~					~	Measuring	EXT	12.04.2019 15:27:32
Ref Level 10		t 10.40 dB 🖷 RB		lode Sweep					•
	0.00 dBm Offse 20 dB SWT	t 10.40 dB 🖷 RB	3W 30 kHz 3W 100 kHz M	lode Sweep					• 1Pk Max
Ref Level 10 Att Frequency S Limit Che	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	01Pk Max -61.92 dBm
Ref Level 10 Att Frequency S Limit Che	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	3 W 100 kHz M	SS				M1[1]	
Ref Level 10 Att Frequency S Limit Che	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 9 Limit Che Line US 1	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 9 Limit Che Line US 1 0 dBm	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 9 Limit Che Line US 1	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 9 Limit Che Line US 1 0 dBm	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm -20 dBm	0.00 dBm Offse 20 dB SWT Sweep	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm -20 dBm -30 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm -20 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm -20 dBm -30 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm -20 dBm -30 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 3 Limit Ch Line US I 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M1[1]	-61.92 dBm
Ref Level 10 Att 1 Frequency 3 Limit Ch Line US I 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 9 Limit Chr Limit Chr Limit Chr 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -60 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS SS					-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 9 Limit Chr Limit Chr Limit Chr 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk SECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS				M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 9 Limit Chr Limit Chr 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -60 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS SS			authomysteritory	M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 9 Limit Chr Limit Chr Limit Chr 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS SS			authorization and	M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 9 Limit Chr Limit Chr Limit Chr 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS SS			an Makana paka Antony	M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 2 Limit Chr Limit Chr Limit Chr 10 dBm -10 dBm -20 dBm -30 dBm -50 dBm -50 dBm -60 dBm -70 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS SS				M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 2 Limit Che Line US 1 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -50 dBm -60 dBm -70 dBm -80 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M PA PA	SS SS				M	-61.92 dBm 19.14890 GHz
Ref Level 10 Att 1 Frequency 2 Limit Chr Limit Chr Limit Chr 10 dBm -10 dBm -20 dBm -30 dBm -50 dBm -50 dBm -60 dBm -70 dBm	0.00 dBm Offse 20 dB SWT Sweep Sk DECT OUT-OF-B/	et 10.40 dB ● RB 889 ms VB	W 100 kHz M	SS SS		0.0 MHz/		M	-61.92 dBm 19.14890 GHz



Lower Channel:

MultiView	Spec	trum										•
Ref Level 10	.00 dBm	Offset	t 10.40 dB 🖲	RBW	/ 30 kHz							
 Att 	20 dB	SWT	1.12 ms	VBW	100 kHz	Mode Sweep						
1 Frequency S	weep											o1Pk Max
Limit Che						ASS					M1[1]	-54.64 dBm
Line US D	ECT OUT-O	OF-RA	ND		ч	ASS					3.	84307000 GHz
0 dBm												
-10 dBm												
-10 UBM												
-20 dBm												
-30 dBm												
US DEEM OUT-OF-	PAND											
OS DECT OUT OF I	UAND											
-50 dBm							м	11				
-60 dBm						A						
						M	nn.	my M				
-70 dBm	a Alarma	and a	Marmana	mb	here and			why w	man	mon	mon	Manara Am
-70 dBm	DICTION OF T		/· /· · · · · · · · · · · · · · · · · ·	~~~~	0.000000	×		×				
-80 dBm												
00 00.07												
CF 3.843 GHz					1001 p	ots		1	.0 MHz/	1	۱ د	Span 10.0 MHz
	~				1001					Measuring		12.04.2019
										measaring	REF	15:31:17

Middle Channel:

MultiView	Spectrum	1							-
Ref Level 10	.00 dBm Offse	et 10.40 dB 🖷 RE	3W 30 kHz						
Att		1.12 ms VE	3 W 100 kHz M	ode Sweep					
1 Frequency S									●1Pk Max
Limit Che	ECT OUT-OF-B		PA PA					M1[1]	-55.08 dBm
				00				3.	84998000 GHz
0 dBm									
-10 dBm									
-20 dBm									
20 0011									
-30 dBm									
USP DEEM OUT-OF-	BAND								
50.10									
-50 dBm				м	1				
				M	2				
-60 dBm					hun A				
				w low				A .	
-70 dBm	monum	mmmm	manum	~ 4	V 7	mun	man	manden	mannen
00.40.0									
-80 dBm									
CF 3.85 GHz			1001 pt	5	1	.0 MHz/		5	pan 10.0 MHz
2. 0100 GHZ	~		1001 pt	-	-		Measuring		12.04.2019
							measuring	REF	15:30:29



Upper Channel:

MultiView	Spe	ctrum									
Ref Level 10	.00 dBm	Offset	: 10.40 dB (RBW	30 kHz						
Att	20 dB	SWT	1.12 ms	VBW	100 kHz 🛛 M	lode Sweep					
1 Frequency S						~~					o1Pk Max
Limit Che Line US D	CK ECT OUT	OF-RA	ND			SS SS				M1[1]	-55.12 dBm
		OI BA								3	.85689100 GHz
0 dBm											
-10 dBm											
10 000											
-20 dBm											
-30 dBm											
ustBelemour-or-	BAND			_							
-50 dBm						M	1				
-60 dBm							Λ				
	.0					man man	hand the		manun	Δ	
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CF 3.856891 0					1001 pt		1	.0 MHz/		<u> </u>	Span 10.0 MHz
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									Measuring	REF	12.04.2019 15:29:36



3.8 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 HP53310A Modulation Domain analyzer. The HP53310A is logged by a computer programmed to get new readings as fast as possible 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 Frequency (MHz)	Max. Diff. (kHz)	Min. Diff. (kHz)	Max. Dev. (ppm)	Limit
1924.999975	15.658	0.275	-4.0	±10 ppm

Deviation ppm = ((Diff. - Mean Diff) / Mean Carrier Freq.) x 10⁶

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}	1924.9631	0.0	0.0	
85% of V _{nom}	1924.9631	0.0	0.0	±10 ppm
115% of V _{nom}	1924.9630	-0.1	-0.1	

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

Frequency Stability over Temperature

Temperature	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit
T = +20 °C	1924.9631	0.0	0.0	
T = -20 °C	1924.9751	12.0	6.2	±10 ppm
T = +50 °C	1924.9553	-7.8	-4.1	

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

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



3.9 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 (µHz)	Frame Repetition
(MHz)	(Hz)		Stability (ppm)
1924.992	100.000	11.132	0.334

Limit:

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

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

3.10 Frame Period and Jitter

Test Method:

ANSI C63.17, clause 6.2.3.

Test Results: Complies

Measurement Data:

The envelope of the RF signal from the EUT is detected with a Crystal Detector and the frame period and jitter is measured with a Frequency Domain Analyzer over at least 100.000 frames.

Carrier Frequency	Frame Period	Max Jitter	3xStandard Deviation of
(MHz)	(ms)	(μs)	Jitter (μs)
1924.992	10.000	-0.035	

Max Jitter = (1/ (Frame period + Pk-Pk/2)) - (1/Frame Period), when Pk-Pk and Frame Period are in Hz

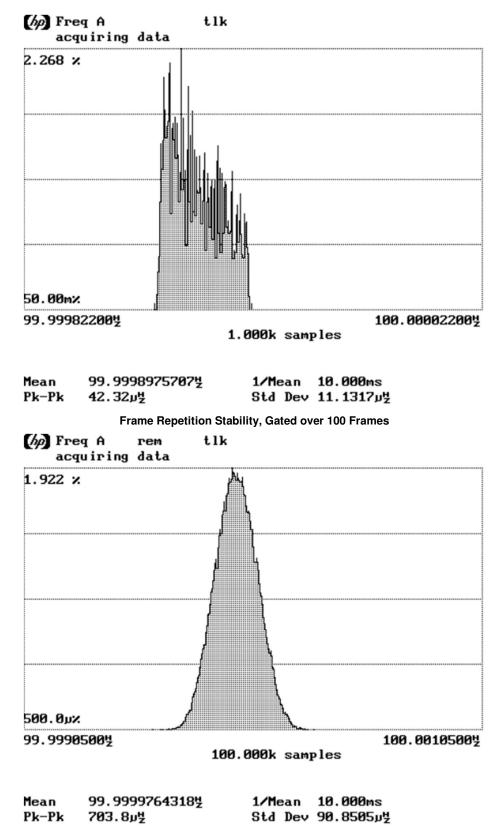
3xSt.Dev.Jitter = 3x (1/(Frame Period + St.Dev) - 1/St.Dev) x 10⁶

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





Frame Period and Jitter



Monitoring Threshold, Least Interfered Channel 3.11

Monitoring Threshold Limits:

Threshold Level:

 $T_L = -174 + 10 \log B + 30 + P_{MAX} - P_{EUT} (dBm)$

B is measured Emission Bandwidth (FCC 15.323) or Occupied Bandwidth (RSS-213 Issue 3) in Hz P_{MAX} is the power limit in dBm

P_{EUT} is measured Transmitter Power in dBm

Calculated values:

	FCC 15.323, RSS-213 Issue 3, clause 5.2
Threshold Level (FCC 15.323)	-80.7 dBm
Threshold Level (RSS-213 Issue 3)	-81.6 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 Threshold Level.

Measurement Procedure:

Test only when Least Interfered Channe	I Procedure is 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 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 f1	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 f ₂	Pass
d) Shall not transmit on f_2	EUT transmits on <i>f</i> ₁	Pass

Limits:

	FCC 15.323, RSS-213 Issue 3, clause 5.2
Threshold Level + 6 dB margin (FCC 15.323)	-74.7 dBm
Threshold Level + 6 dB margin (RSS-213 Issue 3)	-75.6 dBm



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7.3.4 Selected Channel Confirmation, Connection 1.8s After Interferer Removed



3.12 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.



3.13 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 μs and 50*SQRT(1.25/ <i>B</i>)	EUT transmits on f_i	Pass
 d) > largest of 35 µs and 35*SQRT(1.25/B), and with interference level raised 6 dB 	EUT transmits on <i>f</i> ₁	Pass

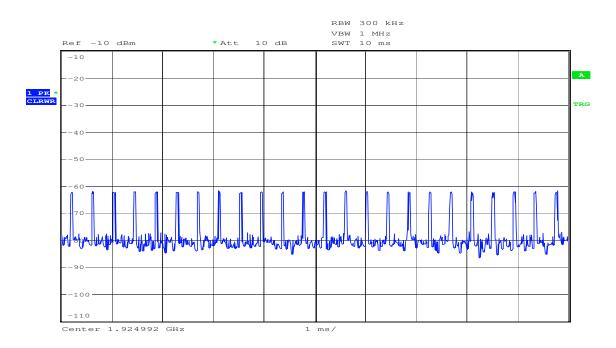
Comment: The test was performed with pulse lengths of 50 µs and 35 µs.

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.

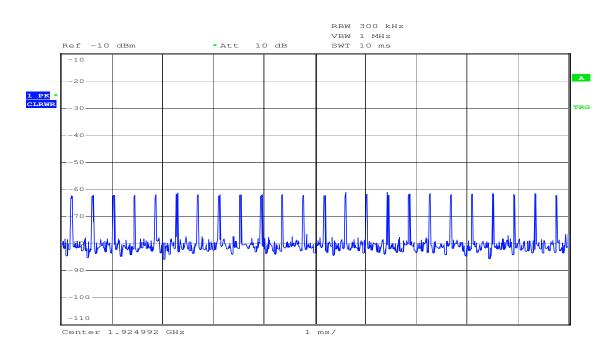
If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be 35xSQRT (1.25/emission bandwidth in MHz) microseconds but shall not be required to be less than 35 μ s.

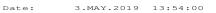




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35 µs Pulses



3.14 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:

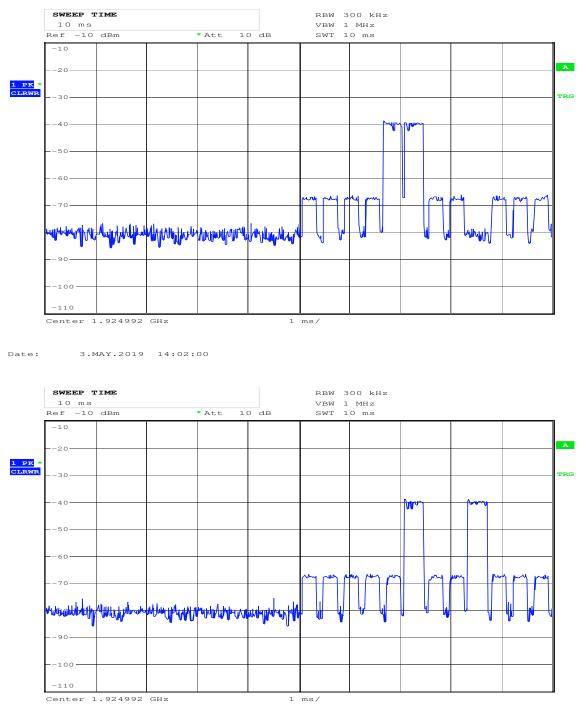
Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. 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

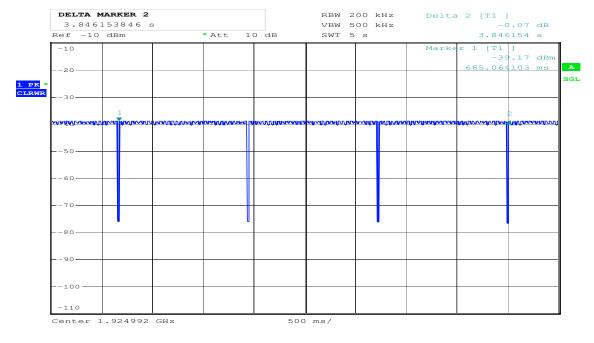


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8.1.2b) Functional Test, Before and After



Access Criteria Check



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3.15 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	5.1 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	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.



3.16 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 <i>fi</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.



3.17 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

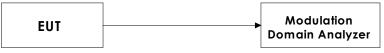
Measurement Uncertainty Values		
Test Item	Uncertainty	
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted (RBW < 100 kHz)	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	±2.2 dB	
Emission Bandwidth	±4 %	
Power Line Conducted Emissions		+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

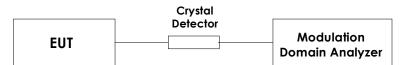
5.1 Frequency Measurements



Test Set-up 1

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

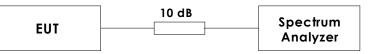
5.2 Timing Measurements



Test Set-up 2

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

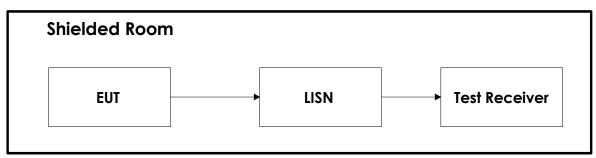
5.3 Conducted Emission Test



Test Set-up 3

This setup is used for all conducted emission tests.

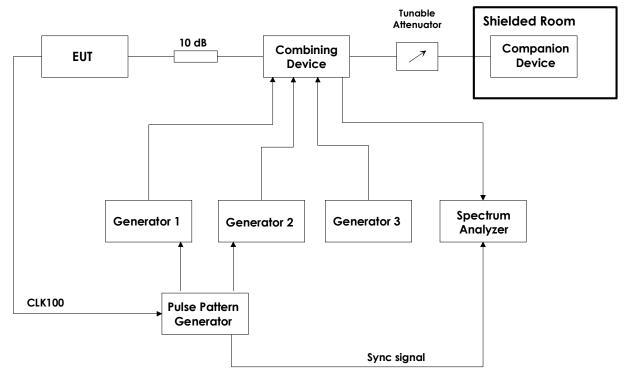
5.4 Power Line Conducted Emissions Test



Test Set-Up 5



5.5 Monitoring Tests



Test 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	FSW43	Spectrum Analyzer	Rohde & Schwarz	LR 1690	2019-01	2020-01
2	SME03	Signal generator	Rohde & Schwarz	LR 1238	COU	
3	SMIQ03B	Signal generator	Rohde & Schwarz	LR 1516	COU	
4	SMHU52	Signal generator	Rohde & Schwarz	LR 1240	COU	
5	53310A	Modulation Domain Analyzer	Hewlett Packard	LR 1483	2018-03	2020-03
6	81110A	Pulse-/ Pattern Generator	Agilent	LR 1725	COU	
7	8470B	Crystal Detector	Hewlett Packard	LR 1207	N/A	
8	6810.17B	Attenuator	Suhner	LR 1669	COU	
9	S212DS	RF Switch	Narda	LR 1244	N/A	
10	745-69	Step Attenuator	Narda	LR 1442	N/A	
11	WE 1506A	Power Splitter	Weinchel	LR 244	COU	
12	WE 1506A	Power Splitter	Weinchel	LR 245	COU	
13	H-9	Hybrid	Anzac	LR 86	COU	
14	H-9	Hybrid	Anzac	LR 257	COU	
15	ENV216	Two Line V-Network	Rohde & Schwarz	LR 1665	2017-11	2019-11
16	ESCI3	Measuring Receiver	Rohde & Schwarz	N-4259	2017-10	2019-10
17	6812B	AC Power Source	Agilent	LR 1515	COU	
18	Model 87 V	Multimeter	Fluke	LR 1597	2018-02	2020-02
19	87H35-1	Circulator	Racal-MESL	s.no.: 140	N/A	
20	87H35-1	Circulator	Racal-MESL	s.no.: 141	N/A	
21	87H35-1	Circulator	Racal-MESL	s.no.: 142	N/A	
22	U2000A	Average Power Sensor	Agilent	LR 1523	2019-03	2020-03
23	FSU26	Spectrum Analyzer	Rohde & Schwarz	LR 1504	2018-01	2020-01

COU = Calibrate on Use

The software listed below has been used for one or more tests.

No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.30.10	Power Line Conducted test software
2	Rohde & Schwarz	EMC32	10.30.10	Radiated Emission test software
3	Rohde & Schwarz	GPIBShot	2.7	Screenshots from R&S Spectrum Analyzers
4	Agilent	Intuitlink Data Capture	2.1.0	Screenshots from HP 53310A

Revision history

Version	Date	Comment	Sign
1.0	2019-05-28	First edition	FS