

7.5. 99% Power Bandwidth

Applied standards

-RSS-Gen issue 5 Section 6.7

Test equipment and test set up

Test equipment used for conducted measurements as given in clause Test equipment of this report. Test setup used for conducted measurements as given in clause Test setups of this report.

Description

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The 99% power bandwidth function of the instrument was used for the measurement.

Measurement

The Measurement was performed on: 03.02.2020 and 14.04.2020

Lowest operating frequency - 802.11b 20MHz / CCK - MCS=0; 1 MBps

Ref Level 30.00 df Att 40 1 Occupied Bandw 20 dBm- 10 dBm-	dB SWT 1.01 ms - VBV		e Auto Sweep M1	fmm			M1[1]	• 1Pk Max 7.90 dBm 2.4114810 GHz	
1 Occupied Bandw	dB SWI LUI ms = VBV			MM				7.90 dBm	
20 dBm			m	M				7.90 dBm	
			MI	M					
		N	MI	M					
10 dBm		N	MI	M					
10 dBm		N	MI	mm					
10 dBm-		N	mm	mm					
		N	WWWW.	(VVVVA					
	2	100							
0 dBm		1 . A 1		V					
		JW			MT2				
-10 dBm		Nº V	-		V V				
	ſ					4			
-20 dBm	N					Y			
-20 UBM-	r				8	Y			
	N					Y			
-30 dBm						4			
NV N	my 1					۱. Y	mm	1	
-40,dBm	<u> </u>				u		~~~··	1An	
Jow v	V					V		1 www	
-50 dBm								- h	
-50 uBm-									
CF 2.412 GHz		1001 pt	S	4	.0 MHz/		:	Span 40.0 MHz	
2 Marker Table									
	Trc X-Value		Y-Value	Occ Bw	Function		Function R		
M1 T1		2.401481 GHz 7.90 dBm 2.4048169 GHz -7.50 dBm			otroid		14.30824534 MHz 2.41197105 GHz		
T2	1 2.4040109		-6.77 dBm	Occ Bw Cer Occ Bw Fre			-28.95017		
Channel	Frequency [MHz]] 99	% Power B	andwidth [N	/Hz]	Limit [MH	[z] [Result	
1	2412		14.308			-/-		Pass	

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Middle Operating Frequency - 802.11b 20MHz / CCK – MCS=0; 1 MBps

MultiView 8	Spectrum								
Ref Level 30.0		• RBW		- 0					10000 500
Att 1 Occupied Bar		1.01 ms 🗢 VBW		e Auto Sweep					●1Pk Max
r occupied bai								M1[1]	8.21 dBm
									2.4364810 GHz
20 dBm			-						
10 dBm		-		M1					
TO UBIN				a a M	00000				
			ο ΛI	m	m				
0 dBm				\\	V				
			JV			M			
-10 dBm			<u>r v</u>			L V Y			
		M					M		
-20 dBm		M					M		
20 0011		\bigwedge					M		8
		N					Y		
-30 dBm-	mm,	P)		
-40AdBm	- Wark						$ \land \land$	mm	1
		V					77		Why
N		U					V		1 📫 🔪
-50 dBm	,								
CF 2.437 GHz			1001 pt		4	.0 MHz/			Span 40.0 MHz
2 Marker Table	`		1001 pt	3	4				span 40.0 MHZ
Type Ref		X-Value	Ĩ	Y-Value	r.	Function	1	Function R	esult
M1		2.436481 GI		8.21 dBm	Occ Bw		14	4.3183196	07 MHz
T1	1	2.4298001 G		-7.55 dBm	Occ Bw Cer				9295 GHz
T2	1 	2.4441185 G	1	-6.77 dBm	Occ Bw Fre				8065 kHz
Channel	Freque	ency [MHz]	99	9% Power B	andwidth [N	//Hz]	Limit [MH:	Result	
6		2437		14.318					Pass

Highest Operating Frequency - 802.11b 20MHz / CCK – MCS=0; 1 MBps

MultiView 8	Spectrum					•				
Ref Level 30.00	dBm	• RBW	200 kHz							
Att 4	0 dB SWT 1.	01 ms 🗢 VBW	1 MHz Mod	e Auto Sweep						
1 Occupied Band	width								●1Pk Max	
								M1[1]		
									2.4624800 GHz	
20 dBm										
10 dBm					M1					
				AAAA	MAAAA					
			Δ	mm	Im	100				
0 dBm				1 7	V					
			JV V			\mathcal{M}^2				
-10 dBm-		- 55	N° V			V V	(6 -			
10 000		N	v.			V	h			
		N					4			
-20 dBm		N					Ч			
		N					6			
-30 dBm-					/					
25.25. 96.35230	0 0 0									
AN	mm							mm	LA A	
-40/dBm	V	11		-		0		(n v	1/2 00	
1 4 4		м					V		IN WIL	
√ -50 dBm									m m	
30 0011										
CF 2.462 GHz			1001 pt	l s	4	.0 MHz/	3		Span 40.0 MHz	
2 Marker Table			1001 p	.0					opur foto filite	
Type Ref	Trc	X-Value		Y-Value		Function		Function F	Result	
M1	1	2.46248 G					1	4.3325067	729 MHz	
T1	1	2.4548136 G		-7.49 dBm	Occ Bw Cer				79851 GHz	
T2	1	2.4691461 G	Hz	-7.50 dBm	Occ Bw Fre	q Offset		-20.1491	53055 kHz	
Channel	Freque	ncy [MHz]	9	9% Power B	andwidth [N	MHz]	Limit [MH	lz]	Result	
11	11 2462			14.333					Pass	

Lowest operating frequency - 802.11g 20MHz / OFDM – MCS=0; 6 MBps

MultiView 😁	Spectrum								
Ref Level 30.00	dBm	• RBW	200 kHz						
		.01 ms 🗢 VBW	1 MHz Mode	e Auto Sweep					
1 Occupied Band	dwidth								●1Pk Max
								M1[1]	6.96 dBm
								2	.4107210 GHz
20 dBm									
10 dBm		2		M1					
				a manual	mono	8 1 320			
2020.0496.049			hunnum	morning	1000 manun	manna	10		
0 dBm		4					V		
		ſ					1		
-10 dBm-		1							
-10 060									
		1							
-20 dBm					12		h		
1974 W. C.		1ª							
	nam	WW					V MA	MA	
-30 dBm/	m w	<u>, 20</u>					Y YL	MA	Δ
mon V								VU	m
nn									wha
-40 dBm									
-50 dBm-									
-50 ubili-									
CF 2.412 GHz			1001 pt		4	.0 MHz/			pan 40.0 MHz
			1001 pt	S	4	.0 MHZ/		5	pan 40.0 MHz
2 Marker Table	-		1		1		Ē		
Type Ref	Trc	X-Value 2.410721 G	U 7	Y-Value 6.96 dBm	O an Buu	Function		Function Re 1478025 4	
M1 T1	1 ·	2.4037406 (-2.74 dBm	Occ Bw Occ Bw Cer	otroid	10.4	2.411964 2.411964	
T2	1	2.4037408 (-2.31 dBm	Occ Bw Fre			-35.505310	
							Line: (TRALL-1	-	
Channel	Freque	ency [MHz]	95	5% Power B	andwidth [N	wnzj	Limit [MHz]	F	lesult
1		2412		16	6.448		-/-		Pass

Middle Operating Frequency - 802.11g 20MHz / OFDM – MCS=0; 6 MBps

20 dbm 10 dbm 10 dbm 10 dbm 10 dbm 20 dbm 10 dbm 10 dbm 20 dbm 10 dbm 10 dbm 10 dbm 20 dbm 10 dbm 10 dbm 20 dbm 10 dbm 10 dbm 10 dbm 10 dbm 10 dbm 20 dbm 10 dbm	MultiView	Spectrum		•			•			
Coccupied Bandwidth #1Pk Mox 20 dBm M1[1] 20 dBm 2.4382790 GH 10 dBm 10 dBm 20 dBm 1001 pts 4.0 MHz/ Span 40.0 MHz 50 dBm 1001 pts 4.0 MHz/ Span 40.0 MHz 21 th 1 2.4383279 GHz 7.21 dBm 50 dBm 0cc Bw Centroid 2.4385279 GHz -2.63 dBm 11 2.4383279 GHz 2.2 435126 GHz -2.23 dBm 12 1 13 2.4287307 GHz 2.2 4351	Ref Level 30.00	dBm	• RBW 20	D0 kHz						<u> </u>
20 dbm M1[1] 7.21 dbm 10 dbm 1 2.4382790 GH2 2.4382790 GH2 10 dbm 1 1 1 1 1 1 1 1 1 1 2.4382790 GH2 1 1 1 1 2.4382790 GH2 1			ms 🗢 VBW	1 MHz Mode	Auto Sweep					
20 dBm 24382790 GHz 10 dBm 10 dBm 20 dBm 10 dBm 10 dBm 10 dBm 20 dBm 2.438279 GHz 2	Occupied Band	lwidth								1Pk Max
20 dBm									M1[1]	7.21 dBm
10 dbm <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2.4382790 GHz</td>										2.4382790 GHz
10 dBm	20 dBm						<u>.</u>			
0 dBm The second se										
0 dBm The second se	0.4 (0.6)									
10 dBm	LO dBm				and the second second	V				
10 dBm				a. ma	month	mmmm	A A			
10 dBm	1 dBm		TID	manno. A	1		month	T2		
20 dBm 40 dBm			X					Y		
20 dBm 40 dBm			/					1		
30 dBm 40 dBm	-10 dBm							1		
30 dBm 40 dBm										
30 dBm 40 dBm								7		
30 dBm 40 dBm	-20 dBm-		N					Y		
-40 dBm		- m Aul	\vee					Ym.	2.0	
-40 dBm	-30 dBm/	n / v ···						V V	MAA	M
440 dBm -40 dBm	mm								- V	W York A
-40 dBm	nor "									Vh
CF 2.437 GHz 1001 pts 4.0 MHz/ Span 40.0 MHz 2 Marker Table Type Ref Trc X-Value Y-Value Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw 16.452943516 MHz T1 1 2.4287307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result	-40 dBm									
IOO1 pts 4.0 MHz/ Span 40.0 MHz CF 2.437 GHz Span 40.0 MHz/ Span 40.0 MHz CF 2.437 GHz Span 40.0 MHz/ Span 40.0 MHz CF 2.437 GHz Span 40.0 MHz/ Span 40.0 MHz CF 2.437 GHz You Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw I 6.452943516 MHz M1 1 2.4387307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz 2.436957143 GHz -42.856537028 kHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result										
IOO1 pts 4.0 MHz/ Span 40.0 MHz CF 2.437 GHz Span 40.0 MHz/ Span 40.0 MHz CF 2.437 GHz Span 40.0 MHz/ Span 40.0 MHz CF 2.437 GHz Span 40.0 MHz/ Span 40.0 MHz CF 2.437 GHz You Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw I 6.452943516 MHz M1 1 2.4387307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz 2.436957143 GHz -42.856537028 kHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result	-50 dBm	1								
Marker Table Type Ref Trc X-Value Y-Value Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw 16.452943516 MHz T1 1 2.4287307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result	oo abiii									
Marker Table Type Ref Trc X-Value Y-Value Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw 16.452943516 MHz T1 1 2.4287307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result										
Type Ref Trc X-Value Y-Value Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw 16.452943516 MHz T1 1 2.4287307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result	E 2.437 GHz		0.7	1001 nt	s	4	.0 MHz/		ĺ	Span 40.0 MHz
Type Ref Trc X-Value Y-Value Function Function Result M1 1 2.438279 GHz 7.21 dBm Occ Bw 16.452943516 MHz T1 1 2.4287307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result				1901 pt	-	•				
M1 1 2.438279 GHz 7.21 dBm Occ Bw 16.452943516 MHz T1 1 2.4287307 GHz -2.63 dBm Occ Bw Centroid 2.436957143 GHz T2 1 2.4451836 GHz -2.63 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result		Trc	X-Value		Y-Value		Function		Function R	esult
T2 1 2.4451836 GHz -2.27 dBm Occ Bw Freq Offset -42.856537028 kHz Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result				z		Occ Bw		1		
Channel Frequency [MHz] 99% Power Bandwidth [MHz] Limit [MHz] Result										
	T2	1 2	2.4451836 GH:	Z	-2.27 dBm	Occ Bw Fre	q Offset		-42.85653	37028 kHz
6 2437 16.453 -/- Pass	Channel	Frequence	y [MHz]	99	% Power Ba	andwidth [N	/Hz]	Limit [MH	z]	Result
	6	243	37		16	.453		-/-		Pass

Highest Operating Frequency - 802.11g 20MHz / OFDM – MCS=0; 6 MBps

MultiView 😁	Spectrum								▼
Ref Level 30.00		• RBW 20							2000 - 201 201
Att 2 1 Occupied Band		01 ms 🗢 VBW	1 MHz Mode	e Auto Sweep					●1Pk Max
r occupied bane								M1[1]	7.17 dBm
								Server a server a server a server	.4632790 GHz
20 dBm									Trool, so one
10 dBm		2 			X				
			n. Ma	mmmm	mon	man			
0 dBm		TIN	maria			er www.www.	12		
		Y					Y I		
-10 dBm							1		
							7		
-20 dBm		N			8		M		
	mm	N					Ma	181	m
-30 dBm/	$\Delta \Lambda M^{\circ}$	W ·					V V V	MMA	
-30 UBIN	V V V							w w V	$\Lambda \Lambda \Lambda$
no Charles									wyha
40 dBm		<u> </u>						2	~ [
-50 dBm									
CF 2.462 GHz			1001 pt	S	4	.0 MHz/	3	S	pan 40.0 MHz
2 Marker Table									
Type Ref	Trc	X-Value		Y-Value		Function		unction Re	
M1	1	2.463279 GH		7.17 dBm	Occ Bw		16.4	5477068	
T1 T2	1	2.4537336 GH: 2.4701884 GH:		-2.66 dBm -2.22 dBm	Occ Bw Cer Occ Bw Fre			2.461961	
Channel	Erocur		1				Limit [MHz]	-	esult
		ency [MHz]	99	99% Power Bandwidth [MHz]					
11		2462		16	6.455	-/-		Pass	

Lowest operating frequency - 802.11n 20MHz / HT MixMode – MCS=0; 6.5 MBps

MultiView 🕄	Spectrum								
Ref Level 30.00		3W 200 kHz							
	0 dB SWT 1.01 ms = VB		de Auto Sweep						
1 Occupied Band	width		50- 						
							M1[1]	6.10 dBm	
							2	.4132390 GHz	
20 dBm									
10 dBm			6	1011					
		0	monthy	manna	0				
0 dBm	T	1 Annon	Mar mar al		which	T2			
		p				r Y			
-10 dBm-									
						X			
-20 dBm				2					
	, t					4			
-30 dBm 	N					LAA	10		
and	munition						"homes	mungh	
mon							°W	mon .	
/-40 dBm								- All	
-50 dBm									
		1001			0.141-7				
CF 2.412 GHz		1001 p	ots	4	.0 MHz/		5	pan 40.0 MHz	
2 Marker Table Type Ref	Trc X-Value		Y-Value	ſ	Function	E.	Function Re	sult	
M1	1 2.413239		6.10 dBm	Occ Bw	- ancion	17	.50471531		
Τ1	1 2.403230		-2.22 dBm	Occ Bw Cer			2.411982		
T2	1 2.420735	1 GHz	-1.99 dBm	Occ Bw Fre	q Offset		-17.2126	4269 kHz	
Channel	Frequency [MH	z] 9	9% Power B	andwidth [N	/Hz]	Limit [MHz] F	Result	
1	2412		17.505					Pass	

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Middle Operating Frequency - 802.11n 20MHz / HT MixMode – MCS=0; 6.5 MBps

MultiView 😁	Spectrum								
Ref Level 30.00		• RBW 20							1.00
Att 4 1 Occupied Band		.01 ms 🗢 VBW	1 MHZ Mode	e Auto Sweep					●1Pk Max
r occapica banc								M1[1]	6,23 dBm
									.4382790 GHz
20 dBm					2				
10 dBm		1							
10 dBm					X				
		T1 0	· AA a achan	month	mon	mm			
0 dBm		ANT	ACTO MOL 10	t	l	· or when	-MY		
-10 dBm									
		1					1		
-20 dBm		/							
20 0011		1					Y		
-33		MN					٦٨		
-30 dBm	Mannon				<i></i>		Maple Jy	both .	with
whather w	M							is why	Malan
-40 dBm-					×	s	22		- and me by Add
									100
-50 dBm-									
SO UDIN									
CF 2.437 GHz			1001 pts	5	4	.0 MHz/		S	pan 40.0 MHz
2 Marker Table					21				
Type Ref		X-Value		Y-Value		Function		Function Re	
M1 T1	1	2.438279 GHz 2.4282217 GHz		6.23 dBm -2.05 dBm	Occ Bw Occ Bw Cer	atroid	17.	2 43698	LZ MHZ 2109 GHz
T2	i	2.4457425 GHz		-1.80 dBm	Occ Bw Fre			-17.89088	
Channel	Freque	ency [MHz]	99	% Power B	andwidth [N	MHz]	Limit [MHz]	F	lesult
6	2	2437		17	.521		-/-		Pass

Highest Operating Frequency - 802.11n 20MHz / HT MixMode – MCS=0; 6.5 MBps

								M1[1]	6.28 dBm 2.4632790 GHz
20 dBm						19			
10 dBm					M1 X -				
0 dBm		T1 Joy of	mm	manning	minn	mmm	MY T2		
-10 dBm									
-20 dBm									
-30 dBm	m	mm					- Mar	my man	
Atto dBm				s		00		.00	mary
-50 dBm									
CF 2.462 GHz			1001 pts	6	4	.0 MHz/		:	Span 40.0 MHz
2 Marker Table Type Ref	Trc	X-Value		Y-Value		Function		Function R	esult
M1 T1 T2		2.463279 GHz 2.4532333 GHz 2.4707368 GHz	Ζ	6.28 dBm -1.97 dBm -1.98 dBm	Occ Bw Occ Bw Cer Occ Bw Fre	ntroid	13	7.5035211	59 MHz 5058 GHz
Channel	Freque	ency [MHz]	99	% Power B	andwidth [N	/Hz]	Limit [MH	z]	Result
		2462			.504		-/-		Pass

Lowest operating frequency - 802.11n 40MHz / HT MixMode – MCS=0; 6.5 MBps

MultiView 😁	Spectrum								
Ref Level 30.00		• RBW 5							
		.01 ms 🗢 VBW	3 MHz Mode	e Auto Sweep					o 1 DL: Max
1 Occupied Band	wiath							144547	IPk Max
								M1[1]	4.57 dBm
									2.4169650 GHz
20 dBm									
10 dBm									
10 dbm				M1					
		2012	a hora	monthing	munun				
0 dBm		T1	moun	k	/	. mound	T2		
		1					7		
		1							
-10 dBm									
		1							
-20 dBm		N							
20 0011		Y				2 O	1		
		\$					Y		
-30 dBm		1		-	-				
-30 dBm	my marken	<u> </u>					man	144	Mun man w
www.	Auna							many produ	Muna
1x40'd8m									a radiation to
-50 dBm-									
30 dbm									
CF 2.422 GHz			1001 pt	S	8	.0 MHz/			Span 80.0 MHz
2 Marker Table									
Type Ref	Trc	X-Value		Y-Value		Function		Function R	esult
M1		2.416965 GH	z	4.57 dBm	Occ Bw		36	.0451798	
Τ1	1	2.4039233 GH		-2.01 dBm	Occ Bw Cer				5896 GHz
T2	1	2.4399685 GH	lz	-2.37 dBm	Occ Bw Fre	q Offset		-54.1041	2627 kHz
Channel	Freque	ncy [MHz]	99	% Power B	andwidth [N	MHz]	Limit [MHz	2] I	Result
3	2	2422		36	.045		-/-		Pass

Middle Operating Frequency - 802.11n 40MHz / HT MixMode – MCS=0; 6.5 MBps

T1 T2	1 1	2.4189457 GHz 2.454964 GHz		-2.26 dBm -2.31 dBm	Occ Bw Ce Occ Bw Fre				95484 GHz 35052 kHz
Type Ref	Trc	X-Value 2.432285 GHz		Y-Value 4.60 dBm	Occ Bw	Function	3	Function R 6.0183118	64 MHz
2 Marker Table			1						
CF 2.437 GHz			1001 pts	i	8	3.0 MHz/			Span 80.0 MHz
-50 dBm									
- PRONTER TO THE TOTAL					×				Mar water with wh
-30 dBm	mutur	wand					byte	Marmon More ma	No.
-30 dBm		1				-			
-20 dBm					2	0			
		1					1		
-10 dBm						-			
0 dBm		T1 produce	man	hame of	pannen	Manna Maria	T2 My		
10 dBm				M1	. And a se				
20 dBm						5.			2,4322850 GHz
								M1[1]	
Att 4 1 Occupied Band		1.01 ms 🗢 VBW	3 MHz Mode	e Auto Sweep					●1Pk Max
Ref Level 30.00		• RBW 50		1					

Highest Operating Frequency - 802.11n 40MHz / HT MixMode – MCS=0; 6.5 MBps

MultiView 😁	Spectrum								
Ref Level 30.00		• RBW 5							
		1.01 ms 🗢 VBW	3 MHz Mode	e Auto Sweep					
1 Occupied Band	awidth								●1Pk Max
								M1[1]	3.89 dBm
									2.4464060 GHz
20 dBm									
10 dBm									
				M1					
			Minn	mound	manne	~			
0 dBm		II month	Mar Mar and		J · · · ·	manna	T2		
		7					4		
-10 dBm-									
-10 UBM-							1		
-20 dBm		1			2		X		
		r ^r					\		
		1					1		
-30 dBm	52 52	m					1		
1 Chra	mann	Mr. C.					Win	Mu	Munhammun
-Abidemannin -	LIU-							. a Muranardar	Myanh 100
M. Dream									and any market
-50 dBm		-		-		-			-
				2	8				
CF 2.452 GHz			1001 pts	6	8	.0 MHz/			Span 80.0 MHz
2 Marker Table									
Type Ref	Trc	X-Value		Y-Value		Function		Function R	
M1	1	2.446406 GH		3.89 dBm	Occ Bw		36	5.0736537	
T1 T2	1	2.4339165 GH 2.4699901 GH		-2.65 dBm -2.65 dBm	Occ Bw Cer Occ Bw Fre			-46.69411	3306 GHz
12	~	2.4033301 011	<u>_</u>	2.05 0011	OCC DW TTE			8201122	1039 KHZ
Channel	Freque	ency [MHz]	99	% Power B	andwidth [N	MHz]	Limit [MHz	z] I	Result
9		2452		36	6.074		-/-		Pass

Results

From the measurement data obtained, the tested sample was considered to have **COMPLIED** with the requirements for the **99% Power Bandwidth**.

8. Test equipment

Test equipment used for Conducted Mains emissions:

Kind of equipment	Manufacturer	Туре	Ident no.	Serial no.	Calibrated on (y-m)	Calibration interval
Test-Receiver	Rohde &	ESHS30	10571	842053/008	2016 – Mar.	3 years
	Schwarz				2019 – Mar.	3 years
Software	PKM	PKM U5/6	-/-	V1.01.03	-/-	-/-
Line impedance	Rohde &	ESH2-Z5			2017 – Okt.	3 years
stabilisation network (LISN)	Schwarz		10139	879675/028	2019 – Jan.	3 years
Shielded room	Siemens	(6,2 x 4,7 x 3,3) m (l x w x h) DC – 10 GHz	10113	1	-/-	-/-

Test equipment used for radiated Measurements:

Kind of equipment	Manufacturer	Туре	Ident no.	Serial no.	Calibrated on (y-m)	Calibration interval
Signal Spectrum Analyzer 2Hz – 26.5 GHz	Rohde & Schwarz	FSW 26 Instrument FW 2.60	11571	102047	2019-Jan.	3 years
ESR7 EMI Testreceiver 7GHz	Rohde & Schwarz	ESR7	11676	101694	2018-March	3 years
Test-Receiver	Rohde & Schwarz	ESVS30	10572	833825/010	2017-Mar. 2020-April	3 years 3 years
Antenna 9 kHz – 30 MHz	EMCO	6502	10546	2018	2017-Nov.	3 years
Antenna 30 MHz – 1 GHz	Chase	CBL6111C	10022	1064	2017-Jan. 2019-Dec.	2 years 3 years
Antenna 1GHz – 18 GHz	Electro Metric	RGA50/60	10273	2753	2017-Nov.	3 years
Broadband- Hornantenne 15 - 26,5 (40) GHz	Schwarzbeck	BBHA 9170	11580	BBHA91706 21	2017-Jan. 2019-Dec.	2 years 3 years
Broadband- Preamplifier 1-18 GHz	Schwarzbeck	BBV9718	11231	9718-002	2017-Okt.	3 years
Preamplifier 18 - 40 GHz	CERNEX	CBM18403523	11679	29711	2017 - May 2019 - July	3 years 3 years
Cable	el-spec GmbH	FlexCore-SMA11- SMA11-8000-ARM	11625	-/-	2017-Dec.	3 years
Shielded	Frankonia	SAC3 "SEMI- ANECHOIC-	11609	004/16	2016-March	3 years
room/Chamber		CHAMBER"		00 // 10	2019-March	3 years
Band Reject Filter	Telemeter	BRF-2450-150- 7-N (0441)	11243	-/-	-/-	-/-

Test equipment used for Band Edge Measurements:

Kind of equipment	Manufacturer	Туре	Ident no.	Serial no.	Calibrated on (y-m)	Calibration interval
ESR7 EMI Testreceiver 7GHz	Rohde & Schwarz	ESR7	11676	101694	2018-March	3 years
Antenna 1GHz – 18 GHz	Electro Metric	RGA50/60	10273	2753	2017-Nov.	3 years
Cable	el-spec GmbH	FlexCore-SMA11- SMA11-8000-ARM	11625	-/-	2017-Dec.	3 years
Shielded	Frankonia	SAC3 "SEMI- ANECHOIC-	11609	004/16	2016-March	3 years
room/Chamber	Frankonia	CHAMBER"	11009	004/10	2019-March	3 years

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Test equipment used for conducted measurements:

Kind of equipment	Manufacturer	Туре	Ident no.	Serial no.	Calibrated on (y-m)	Calibration interval
Signal Spectrum Analyzer 2Hz – 26.5 GHz	Rohde & Schwarz	FSW 26 Instrument FW 2.60	11571	102047	2019-Jan.	3 years
EMI-Test-Receiver	Rohde & Schwarz	ESR7 Instrument FW 3.36	11505	101103	2017 - Nov.	3 years
Automatisation unit RF switch and power meter	Rohde & Schwarz	OSP120 and OSP B157	11573	101282	2017 - Dec.	3 years
Cable	el-spec GmbH	FlexCore-SMA11- SMA11-8000-ARM	11625	-/-	2017 - Dec.	3 years

All measurements were made with measuring instruments, including any accessories that may affect test results, calibrated according to the requests of ISO/IEC 17025 according to which the test site is accredited from DAkkS. Measurement of conducted mains emissions was made with instruments conforming to American National Standard Specification, ANSI C63.4-2014.

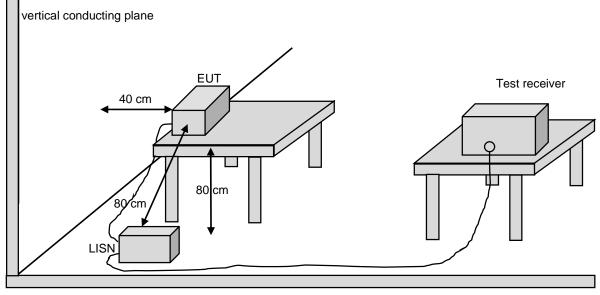
Test equipment to support EUT functions:

Kind of equipment	Manufacturer	Туре	Ident no.
Laptop	HP	EliteBook	11742
AC-Adaptor 120 V ~ / 24 V	-/-	AC1200200	-/-
Router	AVM	Fritz!Box 4020	Client
ZigBee Stick	-/-	ZM3588S-USB-LR	Client

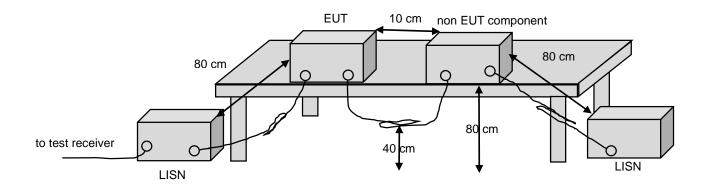
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9. Test Setups

Block diagram Conducted Mains emissions

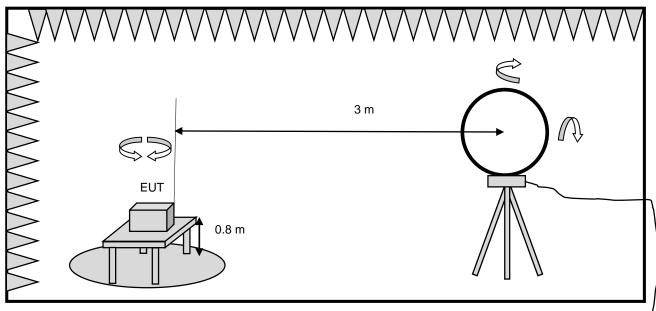


Groundplane



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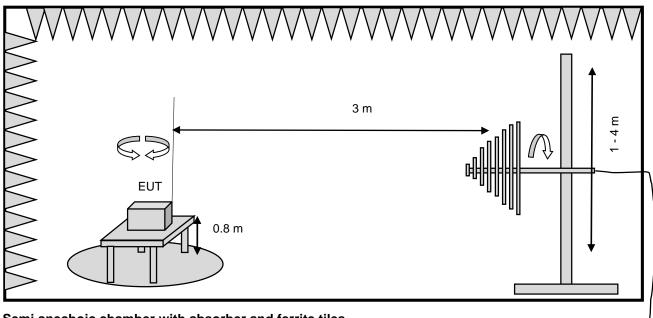
Block diagram Radiated emissions



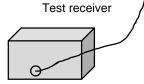
Semi anechoic chamber with absorber and ferrite tiles

tested frequency range 9 kHz - 30 MHz

Block diagram Radiated emissions

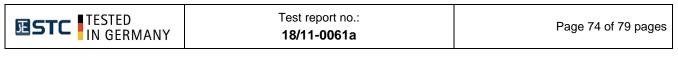


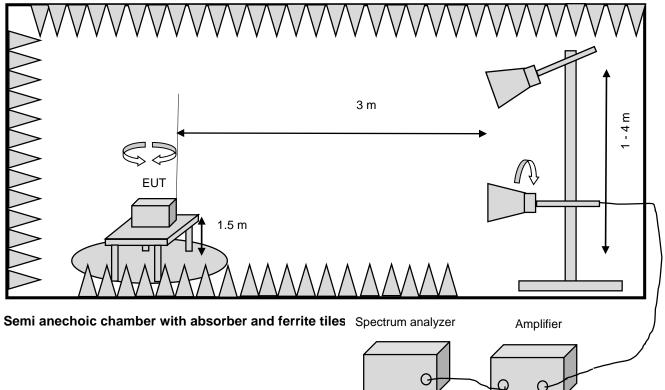
Semi anechoic chamber with absorber and ferrite tiles



Test receiver

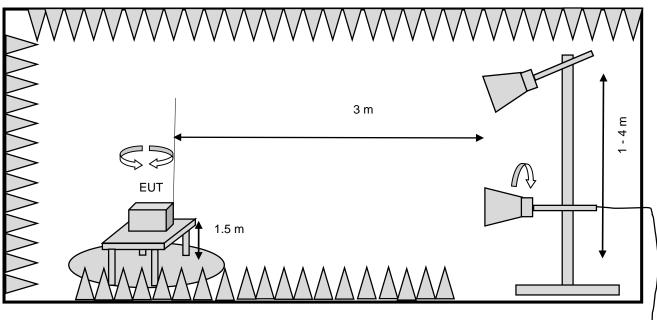
tested frequency range 30 MHz - 1000 MHz





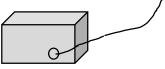
tested frequency range > 1000 MHz

Block diagram Band Edge emissions



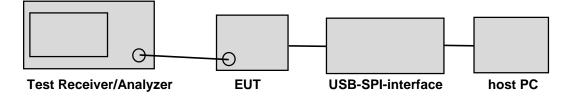
Semi anechoic chamber with absorber and ferrite tiles

Spectrum analyzer



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Block diagram for conducted measurements





10. Measurement uncertainty

according to CISPR 16-4-2 Edition 2.0 2011-06

Measurement	calculated uncertainty U _{lab}	Specified CISPR uncertainty according CISPR 16-4-2 Edition 2.0 2011-06, table 1 UCISPR
Conducted disturbance at mains		
port using AMN	3.6 dB	3.8 dB
9 kHz – 150 kHz		
Conducted disturbance at mains		
port using AMN	3.2 dB	3.4 dB
150 kHz – 30 MHz		
Magn. fieldstrength	3.4 dB	-/-
9kHz - 30MHz	5.4 dB	-/-
Radiated disturbance (electric field		
strength in the SAC)	4.7 dB	6.3 dB
30 MHz to 1 000 MHz		
Radiated disturbance (electric field		
strength in the SAC)	4.1 dB	-/-
1 GHz to 26.5 GHz		

Measurement	calculated uncertainty Ulab	Maximum measurement uncertainty
Channel Bandwidth	1.17 %	±5 %
RF output power, conducted	±1.36 dB	±1.5 dB
Power Spectral Density, conducted	±1.99 dB	±3 dB
Unwanted Emissions, conducted	±1.71 dB	±3 dB
All emissions, radiated	±4.8 dB	±6 dB
Temperature	±0.72 °C	±3 °C
Supply voltages	±0.76 % (DC up to 40V) ±1.74 % (AC 50Hz up to 400V)	±3 %
Time	±0.012 %	±5 %

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above mentioned way.

The measurements uncertainty was calculated in accordance with CISPR 16-4-2 Edition 2.0 2011-06.

The measurement uncertainty was given with a confidence of 95 % (k = 2).



11. Photos setup

Refer to "0061-fcc-ised-photos test setup.pdf" file



12. Conclusions

From the measurement data obtained, the tested sample was considered to have **COMPLIED** with the requirements for the relevant §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

From the measurement data obtained, the tested sample was considered to have **COMPLIED** with the requirements for the relevant RSS-247 issue 02 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

Following specific modifications and/or special attributes are necessary to pass the above mentioned requirements:

none

24.06.2020 Erstellt am/prepared on M. Beindl, Laboratory Engineer (Name/name / Stellung/position)

Martin

(Unterschrift/signature)

24.06.2020

A. Tropmann, Head of Laboratory (Name/name / Stellung/position)

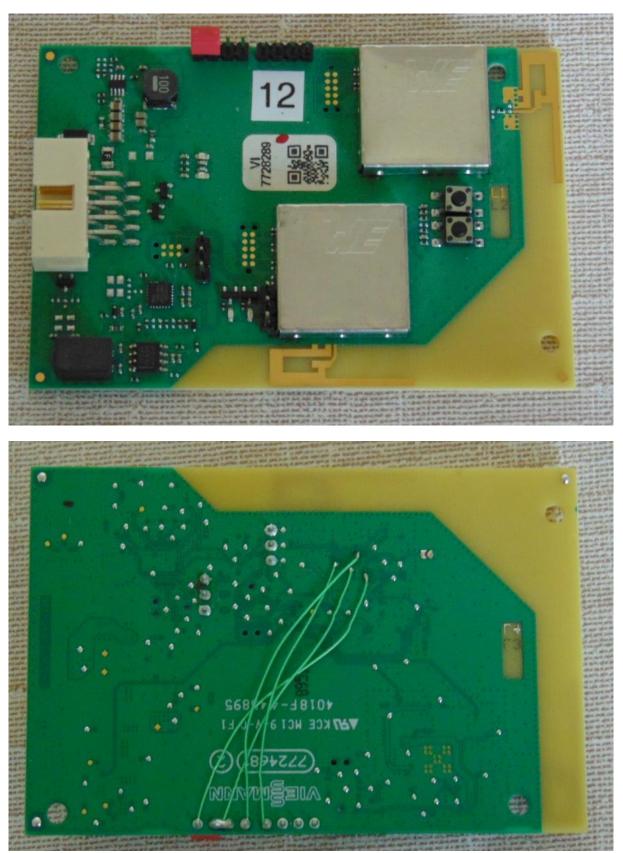
(Unterschrift/signature)

Freigabe am/released on

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13. Photos of tested sample



End of test report