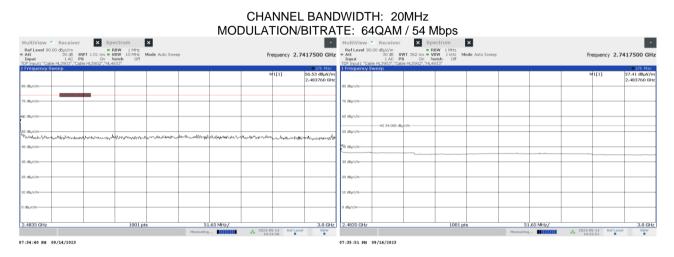
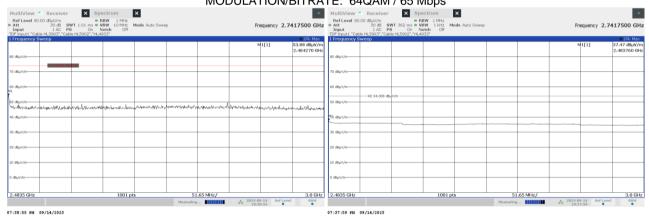


Test specification:	Section 15.247(d) / RSS-2	47 section 5.5, Band edge e	missions
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Vardiate	PASS
Date(s):	14-Sep-23	Verdict:	PASS
Temperature: 24 °C	Relative Humidity: 44 %	Air Pressure: 1010 hPa	Power: 5 VDC
Remarks:			

Plot 7.5.21 The highest emission level within restricted band at high carrier frequency



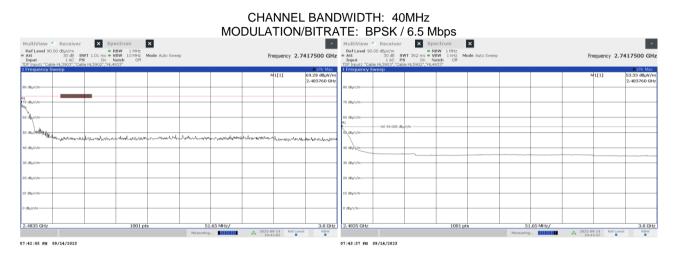
Plot 7.5.22 The highest emission level within restricted band at high carrier frequency CHANNEL BANDWIDTH: 20MHz MODULATION/BITRATE: 64QAM / 65 Mbps



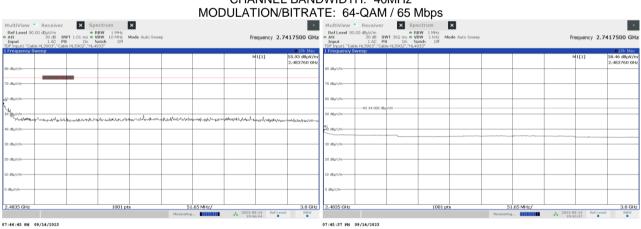


Test specification:	Section 15.247(d) / RSS-2	47 section 5.5, Band edge e	missions
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Vardiate	DASS
Date(s):	14-Sep-23	Verdict:	PASS
Temperature: 24 °C	Relative Humidity: 44 %	Air Pressure: 1010 hPa	Power: 5 VDC
Remarks:		· ·	

Plot 7.5.23 The highest emission level within restricted band at high carrier frequency



Plot 7.5.24 The highest emission level within restricted band at high carrier frequency



CHANNEL BANDWIDTH: 40MHz



Test specification:	Section 15.247(e) / RSS-247	7 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict.	FA35
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

7.6 Peak spectral power density

7.6.1 General

This test was performed to measure the peak spectral power density radiated by the transmitter RF antenna. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Peak spectral power density limits

Assigned frequency	Measurement	Peak spectral power	Equivalent Peak spectral power
range, MHz	bandwidth, kHz	density, dBm	density limit @ 3m, dB(μV/m)*
2400.0 – 2483.5	3.0	8.0	103.2

* - Equivalent Peak spectral power density limit was calculated from the peak spectral power density as follows: E=sqrt(30xP)/r, where P is peak spectral power density and r is antenna to EUT distance in meters.

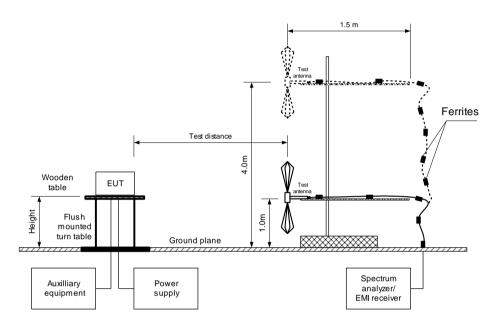
7.6.2 Test procedure for Peak spectral power density measurements

- **7.6.2.1** The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.
- 7.6.2.2 The EUT was adjusted to produce maximum available to end user RF output power.
- **7.6.2.3** The Peak spectral power density of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^o and the measuring antenna height was swept in both vertical and horizontal polarizations.
- **7.6.2.4** The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in peak hold mode with resolution bandwidth set to 3.0 kHz, video bandwidth wider than resolution bandwidth, auto sweep time and sufficient number of sweeps was allowed for trace stabilization. The spectrum lines spacing was verified to be wider than 3 kHz. Otherwise the resolution bandwidth was reduced until individual spectrum lines were resolved and the power of individual spectrum lines was integrated over 3 kHz band.
- **7.6.2.5** The peak of emission was zoomed with span set just wide enough to capture the emission peak area and sweep time was set equal to span width divided by resolution bandwidth. Spectrum analyzer was set in peak hold mode, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 7.6.1 and associated plots.



Test specification:	Section 15.247(e) / RSS-24	47 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict.	PA35
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Figure 7.6.1 Setup for carrier Peak spectral power density measurements





Test specification:	Section 15.247(e) / RSS-24	7 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PA33
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Table 7.6.2 Field strength measurement of peak spectral power density

ASSIGNED FREQUENCY: TEST DISTANCE: TEST SITE: EUT HEIGHT: DETECTOR USED: **RESOLUTION BANDWIDTH:** VIDEO BANDWIDTH: TEST ANTENNA TYPE: TRANSMITTER OUTPUT POWER SETTINGS: 2400.0 - 2483.5 MHz 3 m Semi anechoic chamber 1.5 m RMS 100 kHz 1 MHz Double ridged guide (above 1000 MHz) Maximum

CHANNEL BANDWIDTH: MODUL ATION/BITRATE

I	MODULATION/BITRATE:				CCK / 1 Mbps					
	Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict	
	2412.0	80.18	0	103.2	-23.02	Vertical	1.5	-145	Pass	
	2442.0	80.42	0	103.2	-22.78	Vertical	1.5	-150	Pass	
I	2462.0	80.00	0	103.2	-23.20	Vertical	1.5	-138	Pass	

20 MHz

CHANNEL BANDWIDTH: MODUL ATION/BITRATE

NODULATIO	N/DITRATE.	CCK7 TT Mbps						
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
2412.0	79.89	0	103.2	-23.31	Vertical	1.5	-145	Pass
2442.0	81.16	0	103.2	-22.04	Vertical	1.5	-155	Pass
2462.0	79.93	0	103.2	-23.27	Vertical	1.5	-136	Pass

CHANNEL BANDWIDTH:

MODULATIC	DN/BITRATE:	BPSK / 6 Mbps						
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
2412.0	76.44	0	103.2	-26.76	Vertical	1.5	-144	Pass
2442.0	76.68	0	103.2	-26.52	Vertical	1.5	-150	Pass
2462.0	76.51	0	103.2	-26.69	Vertical	1.5	-145	Pass

CHANNEL BANDWIDTH:

MODULATION/BITRATE:				BPSK / 6.5 Mbps				
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
2412.0	75.55	0	103.2	-27.65	Vertical	1.5	-148	Pass
2442.0	75.67	0	103.2	-27.53	Vertical	1.5	-145	Pass
2462.0	75.52	0	103.2	-27.68	Vertical	1.5	-152	Pass

20 MHz

20 MHz

CCK / 11 Mbps

20 MHz DDCK / C Mhno

Test specification:	Section 15.247(e) / RSS-24	7 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict.	FA33
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Table 7.6.3 Field strength measurement of peak spectral power density (continuation)

ASSIGNED FREQUENCY: TEST DISTANCE: TEST SITE: EUT HEIGHT: DETECTOR USED: **RESOLUTION BANDWIDTH:** VIDEO BANDWIDTH: TEST ANTENNA TYPE: TRANSMITTER OUTPUT POWER SETTINGS: 2400.0 - 2483.5 MHz 3 m Semi anechoic chamber 1.5 m Peak 100 kHz 1 MHz Double ridged guide (above 1000 MHz) Maximum

CHANNEL BANDWIDTH: MODUL ATION/BITRATE

MODULATION/BITRATE:				64QAM / 54 Mbps					
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict	
2412.0	70.98	0	103.2	-32.22	Vertical	1.5	-145	Pass	
2442.0	71.14	0	103.2	-32.06	Vertical	1.5	-150	Pass	
2462.0	71.00	0	103.2	-32.20	Vertical	1.5	-138	Pass	

20 MHz

CHANNEL BANDWIDTH: MODUL ATION/BITRATE

MODULATIO	N/DITRATE.			04QAIVI / 1	equivi co			
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
2412.0	70.42	0	103.2	-32.78	Vertical	1.5	-145	Pass
2442.0	70.95	0	103.2	-32.25	Vertical	1.5	-150	Pass
2462.0	70.67	0	103.2	-32.53	Vertical	1.5	-138	Pass

CHANNEL BA				40 MHz BPSK / 6.5 Mbps					
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict	
2422.0	71.63	0	103.2	-31.57	Vertical	1.5	-145	Pass	
2437.0	71.35	0	103.2	-31.85	Vertical	1.5	-150	Pass	

103.2

CHANNEL BANDWIDTH: MODUL ATION/BITDATE

2452.0

MODULATIO				64-QAM 6	65 Mbps			
Frequency, MHz	Peak spectral power density, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
2422.0	67.66	0	103.2	-35.54	Vertical	1.5	-145	Pass
2437.0	67.98	0	103.2	-35.22	Vertical	1.5	-148	Pass
2452.0	68.15	0	103.2	-35.05	Vertical	1.5	-140	Pass

*- Margin = Field strength - EUT antenna gain - calculated field strength limit.

0

**- EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

71.10

HL 7802 HL 5902 HL 3903 HL 4933		HL 7802	HL 5902	HL 3903	HL 4933				
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Full description is given in Appendix A.

20 MHz

610AM / 65 Mbns

-32.10

40 MHz

Vertical

1.5

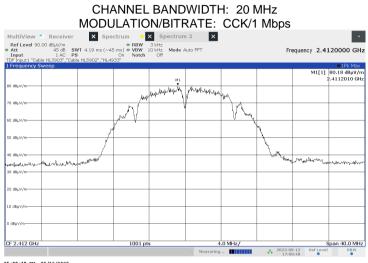
-148

Pass



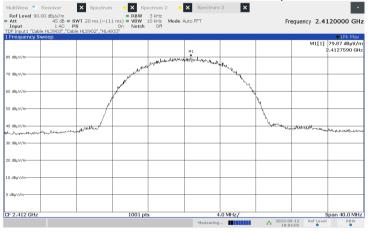
Test specification:	Section 15.247(e) / RSS-24	7 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Plot 7.6.1 Peak spectral power density of carrier at low frequency



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CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: CCK/11 Mbps

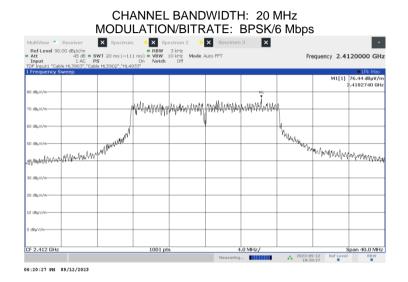


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Test specification:	Section 15.247(e) / RSS-24	7 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Plot 7.6.2 Peak spectral power density of carrier at low frequency (continuation)



CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: 64 QAM/54 Mbps

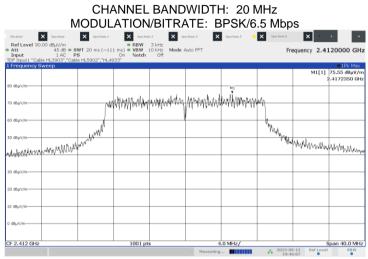
Att Input	45 dB = S1 1 AC PS	WT 20 ms (~11: s	Lms) = VBW On Notch	10 kHz Mode / Off	Auto FFT		Fn	equency	2.4120000
TDF Input1 "Cable	HL3903","Cable	e HL5902","HL49	33"	011					
Frequency Sw	eep								• 1Pk I
								M	1[1] 70.98 dB ₁ 2.4172750
30 d8µV/m									2.4172730
Ju uup v/m									
						M1 7			
0 dBµV/m			ha dhatala	u	ALL ALL AREAS	. Ithanson	1		
		I A	MANNINININ	MANNAVIMAA	MANANA	al'AliakAvAsari	n		
0 dBµV/m			11.1 L 11	1 M 114		- 1			
		l II		''	1		1.		
0 d8µV/m		ايل.					14		
		. with P					"PWWWWWWWWWWWWWWWW		
10 d8µV/m		and the second states and the second states and second states an					100		
wash was and	1 aun som	A. C.					1.00	Wilsonwiki	he Marine Marine Marine Marine
0 dBµV/m									
:0 d8µV/m									
.0 dBµV/m									
dBµV/m									
aphsiu									
F 2.412 GHz			1001 pt	s	4	.0 MHz/			Span 40.0

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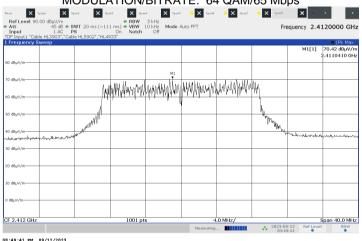
Test specification:	Section 15.247(e) / RSS-2	47 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PA33
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:	•		

Plot 7.6.3 Peak spectral power density of carrier at low frequency (continuation)



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CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: 64 QAM/65 Mbps

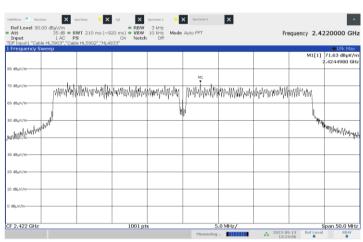


08:49:41 PM 09/12/2023



Test specification:	Section 15.247(e) / RSS-2	47 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PA33
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Plot 7.6.4 Peak spectral power density of carrier at low frequency (continuation)



CHANNEL BANDWIDTH: 40 MHz MODULATION/BITRATE: BPSK / 6.5 Mbps

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CHANNEL BANDWIDTH: 40 MHz MODULATION/BITRATE: 64QAM / 65 Mbps

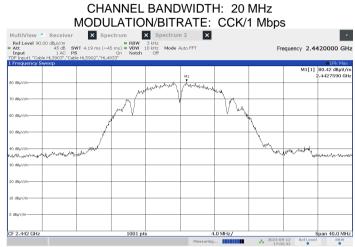
Frequency S	weep							M1[1]	● 1Pk Ma 67.66 dBµV,
									2.4369350 G
I d8µV/m−−−−									
I d8µV/m−−−−								1	
	k ta tikan	MAN	والما والما ما و	and tallater.	at with later.	halasa da antara	hukkatharakk	hueltsnitu	
I dBµV/m−−−−	- WANNA MAN	nala nataatikili	Allin Hadarton and	dentral ter all	Latal History	ant composition	halls Mr. da.	hu hatal	
d8µ/v/m				1	þ			h. 1	
	WW				[- WW	hur .
ashi/w	40°								Witness
d8µV/m									
I dBµV/m───									
dBµV/m									
dBµV/m									

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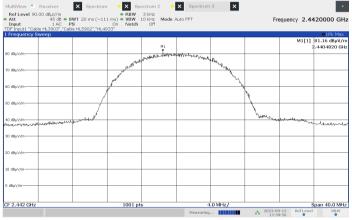
Test specification:	Section 15.247(e) / RSS-24	17 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict.	PASS
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Plot 7.6.5 Peak spectral power density of carrier at mid frequency



05:02:43 PM 09/12/2023

CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: CCK/11 Mbps

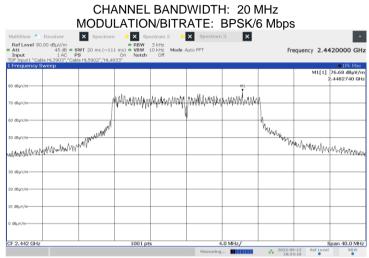


05:59:56 PM 09/12/2023



Test specification:	Section 15.247(e) / RSS-2	47 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:	•		

Plot 7.6.6 Peak spectral power density of carrier at mid frequency (continuation)



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CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: 64 QAM/54 Mbps

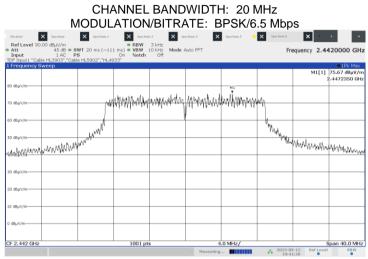
Att	45 dB = 5 1 AC F	SWT 20 ms (~11	1 ms) = VBW On Notch	LO kHz Mode / Off	Auto FFT		Fre	equency 2.44	\$20000 GH
IDF Input1 "Cable	HL3903","Cab	ole HL5902","HL49	33" Noten	OII					
Frequency Sw	/eep	-							1Pk Max
									71.14 dBµV/ 2.4394430 G
0 dBµV/m									2,4394430 G
				M1					
0 dBµV/m				MI I					
o dep v/m		1	hadralkedalde	hadd had bland.	MARIANA DANN	in All Wasahala	1		
		n n	t Marka i se ta di Maria	u wini kaala hadi	ha a sa ahala kut	all a lise a charact			
0 dBµV/m							1.		
							M _a .		
0 dBµV/m-		www.hallalliff					WHW How -		
		Martin					TTPM She		
0 dBµV/m	e al a comproposition	. A WWW.						n when when when	and the second
Interfacement of the city									
0 dBµV/m									
0 dBµV/m-									
0 dBµV/m									
dBµV/m-									
F 2.442 GHz			1001 pt			.0 MHz/		l	Span 40.0 Mł
2.442 0112			1001 pt	•			2023-09		RBW

08:07:09 PM 09/12/2023



Test specification:	Section 15.247(e) / RSS-24	17 section 5.2(2), Maximum	power spectral density	
Test procedure:	ANSI C63.10 section 11.10.2			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS	
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC	
Remarks:				

Plot 7.6.7 Peak spectral power density of carrier at mid frequency (continuation)



07:41:29 PM 09/12/2023

CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: 64 QAM/65 Mbps

Input 1 / IDF Input1 "Cable HL3903	AC PS 3","Cable HL5902","HL4	On Notch 933"	Off					
Frequency Sweep		-						●1Pk Max
							M1[1]	70.95 dBµV/ 2.4407210 G
0 d8µV/m								
			M1					
) d8µV/m			, T					
	(h.	ahaha Ilinaataan	MARKAMAN M.	MANIA MARA	LLANMUM	hta		
d8µV/m	(h	dd a lle fa da a le fa	n hàda mhàdh haol	իշեղերին հայել	We found to the	W		
dop 1/ m	['		' ' V			1		
d8µ/v/m								
uopv/m	. MAN					"Why		
	NAN .					1 'NW		
I dBµV/m antherna thatan an Al	Produced Part					· · · · · · · · · · · · · · · · · · ·	muldhopping	manyuna
I d8µV/m-								
l d8µV/m								
) dBµV/m								-
		1						
dBµV/m		+						
		1						
2,442 GHz		1001 pt		1	.0 MHz/			Span 40.0 Mł
LITTL OFF		1001 pt	*		III III	2023-09	-12 Ref Lev	

08:45:57 PM 09/12/2023



Test specification:	Section 15.247(e) / RSS-24	47 section 5.2(2), Maximum	power spectral density	
Test procedure:	ANSI C63.10 section 11.10.2			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS	
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC	
Remarks:				

Plot 7.6.8 Peak spectral power density of carrier at mid frequency (continuation)

Ref Level 90.0 Att	35 dB 🖷 S	WT 210 ms (~9	 RBW 20 ms) VBW 	3 kHz 10 kHz Mode	Auto FFT		Fre	equency 2.4	370000 G
Input F Input1 "Cable	1 AC P: HL3903","Cabl	S le HL5902","HL49	On Notch	Off					
Frequency Sw	/eep							M1[1]	● 1Pk Ma 71.35 dBµV
									2.4207160 6
d8µ∨/m	М1								
d8µV/m	M1								
	MMMM	Waterwald	MANNAN	NWINNIN	NWWWW	Mr-MMMMah	howant	MWMM	
d8µV/m		····· · //·	, ., ., ,		1	or Month (1.1.1.1.		
	1			l k	W			l.	
d8µV/m	M				·			ΥN [*]	n
deuv/m NewWith									hanghing.
hoh.v/m									
d8µV/m									
d8µ⊻/m									
dBµV/m-									
BuV/m-									
100 ()									
			1001 pt			.0 MHz/			Span 50.0 M

CHANNEL BANDWIDTH: 40 MHz MODULATION/BITRATE: BPSK / 6.5 Mbps

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CHANNEL BANDWIDTH: 40 MHz MODULATION/BITRATE: 64QAM / 65 Mbps

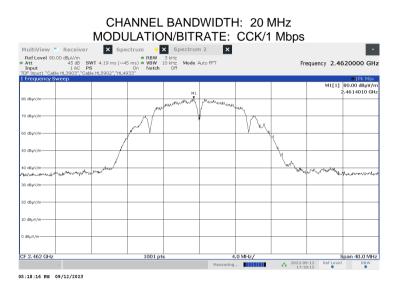
DF Input1 "Cable Frequency Sy	1 AC P e HL3903","Cabl	e HL5902","HL49	On Notch 933"	Off					●1Pk Ma
rrequency of	reep							M1[1]	67.98 dBµV/ 2.4220150 G
0 dBµV/m									
0 dBµV/m		1							
	i dabihatai	halimaan	สมาร์เป็น	and allowing t	absorbed	Masulla Mon	udaalwada	homenan	
) dBµV/m	1.441144	ni a triatti	adi n ta i ndone den	4.0.000.00	La dinita .	*** ******	. II. III. II.	11. 1. 4. 4. 16	
) dBµV/m	M			- i	h – – –			1	
D GBUV/m D GBUV/m	H ^{hu}							η _l μ	Waterpulson,
dBµV/m									
dBµV/m									
dBuV/m-									
dBµV/m									-

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Test specification:	Section 15.247(e) / RSS-24	7 section 5.2(2), Maximum	power spectral density
Test procedure:	ANSI C63.10 section 11.10.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC
Remarks:			

Plot 7.6.9 Peak spectral power density of carrier at high frequency



CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: CCK/11 Mbps

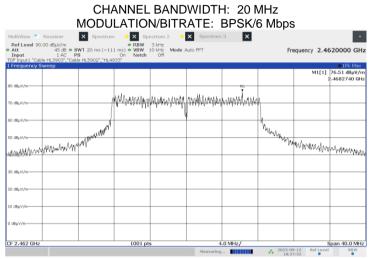
								 1Pk Max
			M1					79.93 dBµV/ 2.4605610 G
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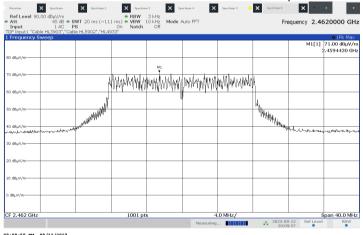
Test specification:	Section 15.247(e) / RSS-2	47 section 5.2(2), Maximum	power spectral density	
Test procedure:	ANSI C63.10 section 11.10.2			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS	
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC	
Remarks:	-			

Plot 7.6.10 Peak spectral power density of carrier at high frequency (continuation)



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CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: 64 QAM/54 Mbps

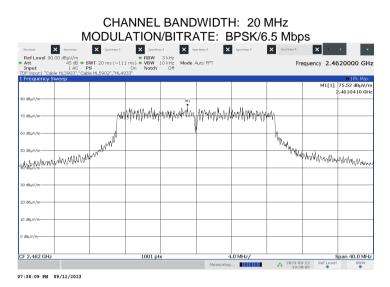


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Test specification:	Section 15.247(e) / RSS-2	47 section 5.2(2), Maximum	power spectral density	
Test procedure:	ANSI C63.10 section 11.10.2			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS	
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC	
Remarks:				

Plot 7.6.11 Peak spectral power density of carrier at high frequency (continuation)



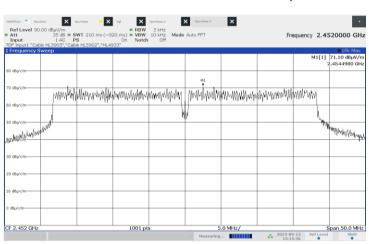
CHANNEL BANDWIDTH: 20 MHz MODULATION/BITRATE: 64 QAM/65 Mbps

Ref Level 90.00 dBµ/// Att 45 0 Input 1 /	B • SWT 20 ms (~1)		10 kHz Mode / Off	Auto FFT		Fre	quency 2.4	1620000 GH
DF Input1 "Cable HL3903	«C PS 3","Cable HL5902","HL∢	On Notch 1933"	ΟΠ					
Frequency Sweep								●1Pk Max
							M1[1]	70.67 dBμV/
								2.4607210 GF
0 dBµV/m								
			M1					
0 dBµV/m		d null a d	ter ne lla	1000	1.1.1.1.11.	ML .		
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F 2,462 GHz		1001 pt	s	4	.0 MHz/	L I		Span 40.0 MH



Test specification:	Section 15.247(e) / RSS-24	7 section 5.2(2), Maximum	power spectral density	
Test procedure:	ANSI C63.10 section 11.10.2			
Test mode:	Compliance	Verdict:	PASS	
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS	
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC	
Remarks:	-			

Plot 7.6.12 Peak spectral power density of carrier at high frequency (continuation)



CHANNEL BANDWIDTH: 40 MHz MODULATION/BITRATE: BPSK / 6.5 Mbps

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CHANNEL BANDWIDTH: 40 MHz MODULATION/BITRATE: 64QAM / 65 Mbps

Frequency S	weep	e HL5902","HL49	933"						●1Pk Max
									68.15 dBµV/ 2.4370150 G
0 d8µ∨/m									
0 dBµV/m				5.11.	111				
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0 dBµV/m					þi –			h	
o dayv/m Jesyczi js starak	NH ^{NY}							MAY	Whiteman
1000 and a									1 1000
0 dBµV/m									
0 dBµV/m									
0 dBµ∀/m									
dBuV/m									

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Test specification:	Section 15.207(a), RSS-Gen, Section 7.2, Conducted emission				
Test procedure:	ANSI C63.4, Section 13.1.3				
Test mode:	Compliance	- Verdict: PASS			
Date(s):	12-Sep-23 - 13-Sep-23	verdict.	FA33		
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC		
Remarks:					

7.7 Conducted emissions

7.7.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.7.1. The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.

Table 7.7.1 Limits for conducted emissions

Frequency,	Class B limit, dB(μV)		
MHz	QP	AVRG	
0.15 - 0.5	66 - 56*	56 - 46*	
0.5 - 5.0	56	46	
5.0 - 30	60	50	

* The limit decreases linearly with the logarithm of frequency.

7.7.2 Test procedure

- **7.7.2.1** The EUT was set up as shown in Figure 7.7.1 and associated photographs, energized and the performance check was conducted.
- **7.7.2.2** The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.7.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.
- 7.7.2.3 The position of the device cables was varied to determine maximum emission level.
- 7.7.2.4 The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.



Test specification:	Section 15.207(a), RSS-Gen, Section 7.2, Conducted emission				
Test procedure:	ANSI C63.4, Section 13.1.3				
Test mode:	Compliance				
Date(s):	12-Sep-23 - 13-Sep-23	Verdict:	PASS		
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC		
Remarks:					



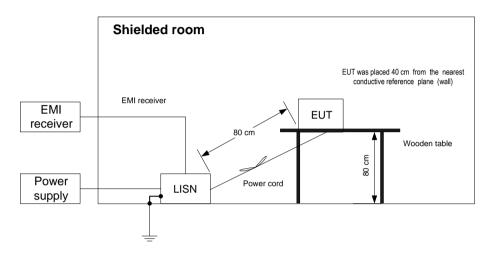


Table 7.7.2 Conducted emission test results

LINE: EUT SET UP: TEST SITE: DETECTORS USED: FREQUENCY RANGE: <u>RESOLUTION BANDWIDTH:</u>	SHIELDED ROOM S USED: PEAK / QUASI-PEAK / AVERAGE Y RANGE: 150 kHz - 30 MHz N BANDWIDTH: 9 kHz							
Frequency, MHz	emission					Line ID	Verdict	
No emission found 20dB below limit							L1	Pass
No emission found 20dB below limit						L2	Pass	

*- Margin = Measured emission - specification limit.

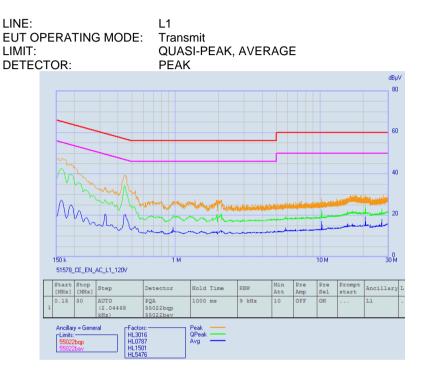
Reference numbers of test equipment used

		HL 0787	HL 3016	HL 5476	HL 5707				
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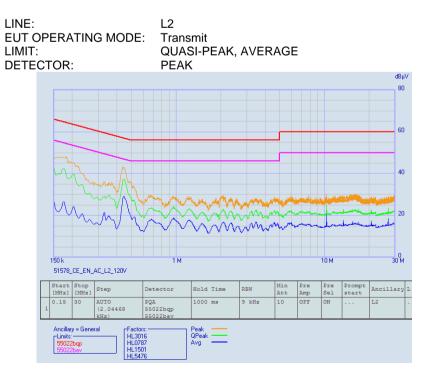
Full description is given in Appendix A.

Test specification:	Section 15.207(a), RSS-Gen, Section 7.2, Conducted emission				
Test procedure:	ANSI C63.4, Section 13.1.3				
Test mode:	Compliance	Verdict:	PASS		
Date(s):	12-Sep-23 - 13-Sep-23	verdict:	PASS		
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC		
Remarks:		·			

Plot 7.7.1 Conducted emission measurements



Plot 7.7.2 Conducted emission measurements





Test specification:	Section 15.207(a), RSS-G	Section 15.207(a), RSS-Gen, Section 7.2, Conducted emission				
Test procedure:	ANSI C63.4, Section 13.1.3					
Test mode:	Compliance	Verdict:	PASS			
Date(s):	12-Sep-23 - 13-Sep-23	verdict.	FA33			
Temperature: 25 °C	Relative Humidity: 44 %	Air Pressure: 1008 hPa	Power: 5 VDC			
Remarks:						



Test specification:	Section 15.203 / RSS-Gen section 6.8, Antenna requirement				
Test procedure:	Visual inspection				
Test mode:	Compliance	Verdict: PA		PASS	
Date(s):	01-Oct-23	verdict:		PASS	
Temperature: 24 °C	Relative Humidity: 46 %	Air Pressure: 1004 hPa	Power:		
Remarks:					

7.8 Antenna requirements

The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed for use with the EUT. This requirement does not apply to professionally installed transmitters.

The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.8.1.

Table 7.8.1 Antenna requirements

Requirement	Rationale	Verdict
The transmitter antenna is permanently attached	Visual inspection	
The transmitter employs a unique antenna connector	NA	Comply
The transmitter requires professional installation	NA	



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
0446	Antenna, Loop, Active, 10 (9) kHz - 30 MHz	EMCO	6502	2857	07-Mar-23	07-Mar-24
3356	Low Pass Filter, 50 Ohm, DC to 1800 MHz.	Mini-Circuits	VLF- 1800+	NA	20-Jun-23	20-Jun-25
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFL EX 102A	1226/2A	16-Apr-23	16-Apr-24
4015	Temp. & Humidity Meter, (-50 - +70) deg, (20 - 99)% RH	Mad Electronics	HTC-1	NA	01-May-23	01-May-24
4135	Shield Box	TESCOM CO., LTD	TC-5916A	5916A000 136	03-May-23	03-May-24
4355	Signal and Spectrum Analyzer, 9 kHz to 7 GHz	Rohde & Schwarz	FSV 7	101630	11-Oct-22	11-Oct-23
4433	Bandpass filter, 1.7 GHz - 2.3 GHz	K&L Microwave Incorporated	6B120- 2000/X60 0-0	F032-5	22-Jun-23	22-Jun-25
4909	High Pass Filter, 50 Ohm, 2640 to 6230 MHz., SMA-FM / SMA-M	Mini-Circuits	VHF- 2275+	NA	22-Jun-23	22-Jun-25
4919	High Pass Filter, 50 Ohm, 3900 to 9800 MHz, SMA-FM / SMA-M	Mini-Circuits	VHF- 3500+	NA	21-Jun-23	21-Jun-25
4933	Active Horn Antenna, 1 GHz to 18 GHz	COM-POWER CORPORATI ON	AHA-118	701046	19-Jan-23	19-Jan-24
4938	Test Cable, 50Ω , 1.8 m, DC to 18 GHz	Mini-Circuits	CBL-6FT- SMNM+	NA	23-Apr-23	23-Apr-24
4956	Active horn antenna, 18 to 40 GHz	COM-POWER CORPORATI ON	AHA-840	105004	08-Mar-23	08-Mar-24
5112	RF cable, 40 GHz, 5.5 m, K-type	Huber-Suhner	SF102EA/ 11SK/11S K/5500M M	502494/2E A	16-Apr-23	16-Apr-24
5288	Trilog Antenna, 25 MHz - 8 GHz, 100W	Frankonia	ALX- 8000E	00809	24-Mar-22	24-Mar-25
5838	Set near field probes	COM-POWER CORPORATI ON	PS-400	151724	05-Jul-22	05-Jul-24
5902	RF cable, 18 GHz, 6.0m, N-type	Huber-Suhner	SF126EA/ 11N/11N/ 6000	NA	08-Dec-22	08-Dec-23
7585	EMI Test Receiver, 1 Hz to 44 GHz	Rohde & Schwarz	ESW44	103130	19-May-22	19-May-23
7802	EMI Test Receiver, 1 Hz to 44 GHz	Rohde & Schwarz	ESW44	103170	15-Sep-22	15-Sep-24



9 APPENDIX B Test equipment correction factors

HL 5288: Trilog Antenna Frankonia, model: ALX-8000E, s/n: 00809 30-1000 MHz

Frequency, MHz	Antenna factor, dB/m
30	14.96
35	15.33
40	16.37
45	17.56
50	17.95
60	16.87
70	13.22
80	10.56
90	13.61
100	15.46
120	14.03
140	12.23

Frequency, MHz	Antenna factor, dB/m
160	12.67
180	13.34
200	15.40
250	16.42
300	17.28
400	19.98
500	21.11
600	22.90
700	24.13
800	25.25
900	26.35
1000	27.18

The antenna factor shall be added to receiver reading in $dB_{\mu}V$ to obtain field strength in $dB_{\mu}V/m$. above 1000 MHz

above
Antenna factor, dB/m
26.9
28.1
28.4
29.6
29.1
30.4
30.7
31.5
32.3
32.6
32.5
32.9
33.5
33.2
33.7
34.6
34.7
34.6
35.0
35.5
36.2
36.8
36.8
37.0
37.5
38.2

Frequency, MHz	Antenna factor, dB/m
3600	38.9
3700	39.4
3800	39.4
3900	39.6
4000	39.7
4100	39.8
4200	40.5
4300	40.9
4400	41.1
4500	41.4
4600	41.3
4700	41.6
4800	41.9
4900	42.3
5000	42.7
5100	43.0
5200	42.9
5300	43.5
5400	43.6
5500	44.3
5600	44.7
5700	45.0
5800	45.0
5900	45.3
6000	45.9

The antenna factor shall be added to receiver reading in $dB_{\mu}V$ to obtain field strength in $dB_{\mu}V/m$.



HL 0446: Active Loop Antenna EMCO, model: 6502, s/n 2857

Frequency,	Measured antenna factor, dBS/m	Measurement uncertainty, dB
10	-33.4	±1.0
20	-37.8	±1.0
50	-40.5	±1.0
75	-41.0	±1.0
100	-41.2	±1.0
150	-41.2	±1.0
250	-41.1	±1.0
500	-41.2	±1.0
750	-41.3	±1.0
1000	-41.3	±1.0

Frequency,	Measured antenna factor, dBS/m	Measurement uncertainty, dB
2000	-41.4	±1.0
3000	-41.4	±1.0
4000	-41.5	±1.0
5000	-41.5	±1.0
10000	-41.7	±1.0
15000	-42.1	±1.0
20000	-42.7	±1.0
25000	-44.2	±1.0
30000	-45.8	±1.0

The antenna factor shall be added to receiver reading in $dB\mu V$ to obtain field strength in $dB\mu A/m$.



HL 4933: Active Horn Antenna COM-POWER CORPORATION, model: AHA-118, s/n 701046

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
1000	-16.1
1500	-15.1
2000	-10.9
2500	-11.9
3000	-11.1
3500	-10.6
4000	-8.6
4500	-8.3
5000	-5.9
5500	-5.7
6000	-3.3
6500	-4.0
7000	-2.2
7500	-1.7
8000	1.1
8500	-0.8
9000	-1.5
9500	-0.2

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
10000	1.8
10500	1.0
11000	0.3
11500	-0.5
12000	3.1
12500	1.4
13000	-0.3
13500	-0.4
14000	2.5
14500	2.2
15000	1.9
15500	0.5
16000	2.1
16500	1.2
17000	0.6
17500	3.1
18000	4.2

The antenna factor shall be added to receiver reading in $dB_{\mu}V$ to obtain field strength in $dB_{\mu}V/m$.



10 APPENDIX C Measurement uncertainties

Test description	Expanded uncertainty
Conducted carrier power at RF antenna connector	Below 12.4 GHz: ± 1.7 dB
	12.4 GHz to 40 GHz: ± 2.3 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB
	2.9 GHz to 6.46 GHz: ± 3.5 dB
	6.46 GHz to 13.2 GHz: ± 4.3 dB
	13.2 GHz to 22.0 GHz: ± 5.0 dB
	22.0 GHz to 26.8 GHz: ± 5.5 dB
	26.8 GHz to 40.0 GHz: ± 4.8 dB
Occupied bandwidth	± 8.0 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB
	150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance	
Horizontal polarization	Biconilog antenna: ± 5.3 dB
	Biconical antenna: ± 5.0 dB
	Log periodic antenna: ± 5.3 dB
	Double ridged horn antenna: \pm 5.3 dB
Vertical polarization	Biconilog antenna: ± 6.0 dB
	Biconical antenna: ± 5.7 dB
	Log periodic antenna: ± 6.0 dB
	Double ridged horn antenna: \pm 6.0 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.



11 APPENDIX D Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, Radio, Safety, Environmental and Telecommunication testing facility.

Hermon Laboratories is recognized and accredited by the Federal Communications Commission (USA) for relevant parts of Code of Federal Regulations 47 (CFR 47), Test Firm Registration Number is 927748, Designation Number is IL1001; Recognized by Innovation, Science and Economic Development Canada for wireless and terminal testing (ISED), ISED #2186A, CAB identifier is IL1001; Certified by VCCI, Japan (the registration numbers for OATS are R-10808 for RE measurements below 1 GHz, G-20112 for RE measurements above 1 GHz, R-11082 for anechoic chamber for RE measurements below 1 GHz, G-10869 for RE measurements above 1 GHz, C-10845 for conducted emissions site and T-11606 for conducted emissions at telecommunication ports).

The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing, environmental simulation and calibration (for exact scope please refer to Certificate No. 839.01, 839.03 and 839.04).

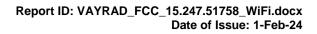
Address:P.O. Box 23, Binyamina 3055001, Israel. Telephone: +972 4628 8001 Fax: +972 4628 8277 e-mail: mail@hermonlabs.com website: www.hermonlabs.com

Person for contact: Mr. Michael Nikishin, EMC&Radio group manager



12 APPENDIX E Specification references

FCC 47CFR part 15: 2020	Radio Frequency Devices
ANSI C63.10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63.4: 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
RSS-247 Issue 2: 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence- Exempt Local Area Network (LE-LAN) Devices
RSS-Gen Issue 5	General Requirements and Information for the Certification of Radiocommunication
with_amendment_1_2: 2021	Equipment
ICES-003: 2020, Issue 7	Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement





13 APPENDIX F Abbreviations and acronyms

А	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(µV/m)	decibel referred to one microvolt per meter
dB(μA)	decibel referred to one microampere
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT F	equipment under test
г GHz	frequency gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μS	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω PM	Ohm pulse modulation
PM PS	pulse modulation power supply
ppm	part per million (10 ⁻⁶)
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
S	second
Т	temperature
Tx	transmit
V	volt
WB	wideband



14 APPENDIX G Manufacturer's declaration



Declaration of Identity

We, the undersigned,

Company: Vayyar Imaging Ltd. Address: Shabazi 26, Yehud Country: Israel Telephone number: +972-54-42254549

declare under our sole responsibility that the following equipment:

Brand/Item	Type/Model	Short Product description
Vayyar Imaging LTD.	VMPRO19CB4BAT,	Handheld UWB device with
	VMPRO19EB4BAT	optional WI-FI/BLE
		communication

Has an identical RF system as the following equipment:

Brand/Item	Type/Model	Short Product description
Vayyar Imaging LTD.	VMPRO19CB4WREP	Handheld UWB device with
	VMPRO19EB4WREP	optional WI-FI/BLE
		communication

The reason for name change is: VMPRO19CB4BAT, VMPRO19EB4BAT has an integrated battery and can be supplied by either the battery or by external power source (through USBC port). VMPRO19CB4WREP, VMPRO19EB4WREP doesn't contain battery and thus can only be powered by external power source.

21/07/202	22
	~
(date)	

(signature)

Naftali Chayat (printed name)

CTO (position)

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