

	Test Report						
47 CFI	R FCC Part 15 subpart C						
Ir	ntentional Radiators						
Report reference no	28110821_024						
FCC Designation Number	IT0008						
FCC Test Firm Registration #:	804595						
Tested by (name + signature):							
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Address	Via Mattei 3 - 20010 - Pogliano Milanese (MI) – Italy						
Applicant's name	CUSTOM S.p.A						
Address	Via Berettine, 2 – 43010 Fontevivo (PR) - Italy						
Test item description	UHF RF module						
Trade Mark	CUSTOM						
Manufacturer	CUSTOM						
Model/Type reference	BD099						
Ratings	DC Power +3,3V (serial line) DC Power +5V (USB line)						
Sample							
Samples received on	14/09/2017						
TUV reference samples	170496 (sampled by the customer)						
Samples tested n	1						
Testing							
Start Date:	21/09/2017						
End Date:	29/03/2018						
End Date:: The results in this Test Report are exclusively re S.r.I. th	29/03/2018 eferred to the tested samples. Without the written authorization of TÜV Rheinland is document can be reproduced only integrally						



# SUMMARY

1.	Reference Standards	3
2.	Summary of testing	4
З.	General product information	6
4.	General Chipset information	7
5.	General Antennas information	8
6.	Equipment Used During Test	9
7.	Input/Output Ports	9
8.	Power Interface	10
9.	EUT Operation Modes	10
10.	EUT Configuration Modes	11
11.	Test Conditions and Results	12
11.1	TEST: Antenna requirements	12
11.2	TEST: AC Power Conducted Emission	13
11.3	TEST: Radiated Emission	26
11.4	TEST: 20dB Bandwidth	61
11.5	TEST: RF power output, radiated (EIRP)	65
11.6	TEST: Out-of-band emissions	69
11.7	TEST: 100 kHz Bandwidth of Frequency Band Edges	74
11.8	TEST: Number of Hopping frequencies	95
11.9	TEST: Carrier frequency separation	97
11.1	0 TEST: Average time of occupancy	101
11.1	1 TEST: RF Exposure Requirements	105



1. Reference Standards					
Standard	Description				
FCC Part 15 (Subpart C)	§15.247 Operation within the bands 902-928 MHz, 2400-2483,5 MHz, and 5725-5850 MHz.				
FCC Part 15 (Subpart C)	§15.207 Conducted Limits				
FCC Part 15 (Subpart C)	§15.209 Radiated emission limits; general requirements				
FCC Part 15 (Subpart C)	§15.203 Antenna Requirement				
ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz				
ANSI C63.10:2013	American National Standard for Testing Unlicensed Wireless Devices				

RELEASE CONTROL RECORD					
Test report Number	Date of Issue				
28110821_012	Original release	2017-12-15			
28110821_022	Modified test 11.10 Average time of occupancy and removed photographic documentation.	2018-03-29			
28110821_024	Modified modulation from GFSK to ASK on paragraph 4	2018-07-31			



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Report No. 28110821\_024

2. Summary of testing						
§ 15.203 § 15.247 (b)(4)(i)	§ 15.203     Antenna Requirements       § 15.247 (b)(4)(i)     Image: Comparison of the second sec					
§ 15.207 (a)	Power Line Conducted Emission	PASS				
§ 15.209 (a) (f)	Radiated Emission	PASS				
§ 15.247 (d)	Out-of-band emissions	PASS				
§ 15.247 (d)	100 kHz Bandwidth of Frequency Band Edges	PASS				
§ 15.247 (a)	Frequency Hopping Spread Spectrum Specifications					
§ 15.247(a)	20 dB Bandwidth	PASS				
§ 15.247(a)(1)	Carrier frequency (Hopping Channel) Separation	PASS				
§ 15.247(a)(1)(iii)	Number of Hopping Channels Used	PASS				
§ 15.247(a)(1)(iii)	PASS					
§ 15.247(a)(2)	6dB Minimum Bandwidth	N.A. <sup>1</sup>				
§ 15.247(b)	Maximum Peak Output Power					
§ 15.247(b) (1)	Peak Output Power, radiated (EIRP)	PASS				
§ 15.247(b) (3)	RF power output, radiated (EIRP)	N.A. <sup>1</sup>				
§ 15.247(b) (4)	Antenna gain					
§ 15.247(c)	Operation with directional antenna gains greater than 6 dBi	N.A.				
§ 15.247 (e)	Power Spectral Density	N.A. <sup>1</sup>				
§ 15.247 (f)	Hybrid systems	N.A.				
§ 15.247 (g)	FHSS Transmission characteristics	PASS				
§ 15.247 (h)	Recognition of occupied channel and multiple transmission system	N.A				
§ 15.247(i) (§ 47CFR 1.1307(b)(1))	RF humane exposure	PASS				

Note 1	Not applicable for DSS equipment



Possible test case verdicts:	
- test case does not apply to the test object:	N/A
- test object does meet the requirement:	PASS
- test object does not meet the requirement:	FAIL

#### General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

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"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.







4. General Chipset information							
Type of equ	ipment	Radio mod	ule				
Operating f	requency	902 ÷ 928	MHz				
Equipment	Class	DSS					
Max radiate	d power	108,13 dB	uV/m (QP leve	at 3m. dista	nce)		
Modulation		ASK					
Channel Sp	acing	500kHz					
Channel ba	ndwidth	75kHz					
Number of	channels	50					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	902.750	2	903.250	3	903.750	4	904.250
5	904.750	6	905.250	7	905.750	8	906.250
9	906.750	10	907.250	11	907.750	12	908.250
13	908.750	14	909.250	15	909.750	16	910.250
17	910.750	18	911.250	19	911.750	20	912.250
21	912.750	22	913.250	23	913.750	24	914.250
25	914.750	26	915.250	27	915.750	28	916.250
29	916.750	30	917.250	31	917.750	32	918.250
33	918.750	34	919.250	35	919.750	36	920.250
37	920.750	38	921.250	39	921.750	40	922.250
41	922.750	42	923.250	43	923.750	44	924.250
45	924.750	46	925.250	47	925.750	48	926.250
49	926.750	50	927.250				







6. Equipment Used During Test							
Use*	Product Type	Manufacturer	Model	Comments			
EUT	UHF RF module	CUSTOM	BD099				
AE	PC	Lenovo	T430	Used to set UHF RF module			

Note:

\* Use :

EUT - Equipment Under Test,

AE - Auxiliary/Associated Equipment, or

SIM - Simulator (Not Subjected to Test)

No other Auxiliary/Associated Equipment was connected/installed on the EUT

CON	CONNECTIONS							
Port	t	Description Connection		Dimensions/lenght				
1	1 Enclosure Open frame			42 x 42 mm.				
2	AC Power Port	Port not present						
3	3 DC Power Port DC +3,3 V (via Serial line) or +5V (via USB line) <50cm							
4	4 LAN Port not							
5	5 USB/RS232 I/O Data transmission/reception <50cm							
	*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) WN = Wired Network							



8. Power Interface							
Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments	
Rated	3,3÷5						

9. EUT	Operation Modes
Operation mode	Description
#1	Continuous Modulated RF Transmission (at selected channel) Power setting during tests: 199 Sensibility setting during tests: 200 Radiated test with antenna type BD106
#2	Continuous Modulated RF Transmission (at selected channel) Power setting during tests: 199 Sensibility setting during tests: 200 Radiated test with antenna type ST069-AU
#3	Continuous Modulated RF Transmission (at selected channel) Power setting during tests: 199 Sensibility setting during tests: 200 Conducted test at RF connector
#4	Continuous Modulated RF Transmission (hopping mode) Power setting during tests: 199 Sensibility setting during tests: 200 Conducted test at RF connector
#5	Continuous Modulated RF Transmission (hopping mode) Power setting during tests: 199 Sensibility setting during tests: 200 Radiated test with antenna type BD106
#6	Continuous Modulated RF Transmission ((hopping mode) Power setting during tests: 199 Sensibility setting during tests: 200 Radiated test with antenna type ST069-AU



10. EUT Configu	iration Modes								
Mode # Description									
#1 #2 #3 #4 #5 #6	UHF RF module connected via USB at personal computer during all tests.								
The field strength is calc Antenna Correction Factor	ulated by subtracting the Amplifier Gain and adding the Cable Loss and or to the measured reading. The basic equation is as follows:								
Fiel	d Strength ( $dB\mu V/m$ ) = RAW - AMP + CBL + ACF								
Whe	re: $RAW = Measured$ level before correction ( $dB\mu V$ )								
	AMP = Amplifier Gain (dB)								
	CBL = Cable Loss (dB)								
	ACF = Antenna Correction Factor (dB/m)								
	$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$								
Sample 1	radiated emissions calculation @ 30 MHz								
Measure Emission	ment +Antenna Factor–Amplifier Gain+Cable loss=Radiated ns (dBuV/m)								
	25  dBuV/m + 17.5  dB - 20  dB + 1.0  dB = 23.5  dBuV/m								



#### **11. Test Conditions and Results**

11.1 TEST: Antenna requirement	ts		PASS		
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C			
test	aments     he   Laboratory Ambient Temperature (°C)   15 to 35 °C     Relative Humidity (%)   30 to 60 %     he   Laboratory Ambient Temperature (°C)   21°C     Relative Humidity (%)   56%     Air pressure (hPa)   1020     Power supply and Frequency   Application Po     d at   +5Vdc      Øperation mode      §15.203 § 15.247 (B)(4)(I)				
Parameters recorded during the	Laboratory Ambient Temperature (°C)	21°C			
test	Relative Humidity (%)	56%			
	Air pressure (hPa)	1020			
	Power supply and Frequency	Application Po	oint		
Fully configured sample tested at the power line frequency	+5Vdc				
Equipment mode:	Operation mode				
FCC Standard	§15.203 § 15.247 (B)(4)(I)				
An intentional radiator shall be desi	aned to ensure that no antenna other that	n that furnished by th	e		

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

Antenna specifications						
N° of authorized antenna types	2					
Antenna type	CUSTOM antenna type BD106 AND ST069-AU					
Maximum total gain	<0 dBi					
External power amplifiers	Not present					



11.2 TEST: AC Power Conducted Emission PASS							
Parameters required prior to the	Laboratory Ambient Temperature (	°C) 15 to 35 °	C				
test	Relative Humidity (%)	30 to 60 °	6				
Parameters recorded during the	Laboratory Ambient Temperature (	°C) 21°C					
test	Relative Humidity (%)	56%					
	Air pressure (hPa)	1020					
_	Power supply and Frequency	Application I	Point				
Fully configured sample tested at the power line frequency	115V ~ 60Hz	AC Mains					
Equipment mode:	Operation mode	#1					
FCC Standard	§15	.207					
Frequency (MHz)	Quasi-peak (dBuV)	Average (dBuV)	Result				
0,15-0,5	66 to 56	56 to 46 PA					
0,5-5	56	46 PAS					
5-30	60	50	PASS				
Except as shown in paragraphs (b)	and (c) of this section, for an intentio	nal radiator that is desig	ned to be				

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

	Conducted limit (dBµV)				
Frequency of emission (MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			

Further information to test setup







Test Equipment Used										
Description	Manufacturer	Model	TUV Identifier	Calibration date	Calibration due					
EMI Test Receiver	R&S	ESR3	87020864	11/2016	11/2017					
LISN	EMCO	3825/2	87020719	03/2016	03/2018					
Pulse limiter	R&S	ESH3-Z2	87020962	05/2017	05/2018					
Stabilized Power Supply	Elettrotest	TPS T 30K60S	87020490	09/2015	09/2018					





Final Measurement - Table representation of Mains Terminal Disturbance Voltage Measurement

|--|

Low Channel (902.75MHz)

Phase

Test Results										
Tested Port	Line	Frequency (MHz)	Value (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	A Value (dBµV)	verage Valı Limit (dBµV)	ue Margin (dB)	Factor total Line P (dB)	
AC Mains	Ρ	0,180	56,46	64,50	8,04	38,90	54,50	15,60	10,82	
AC Mains	Р	0,240	49,94	62,10	12,16	31,46	52,10	20,64	10,80	
AC Mains	Ρ	27,429	45,96	60,00	14,04	28,32	50,00	21,68	11,31	
Note: Fa	Note: Factor total = Lisn factor + Cable factor + Pulse limiter factor.									



Report No. 28110821\_024





Final Measurement - Table representation of Mains Terminal Disturbance Voltage Measurement

Operation Mode: #1

Low Channel (902.75MHz)

Neutral

Test Results										
Tested				Quasi-Peak			verage Valu			
Port	Line	Frequency (MHz)	Value (dBµV)	Limit (dBµV)	Margin (dB)	Value (dBµV)	Limit (dBµV)	Margin (dB)	Factor total Line N (dB)	
AC Mains	Ν	0,186	53,96	64,21	10,25	36,32	54,21	17,90	10,82	
AC Mains	Ν	0,244	48,05	61,95	13,90	33,73	51,95	18,22	10,80	
AC Mains	Ν	27,428	45,89	60,00	14,11	25,27	50,00	24,73	11,31	

Note: Factor total = Lisn factor + Cable factor + Pulse limiter factor.



Report No. 28110821\_024





Final Measurement - Table representation of Mains Terminal Disturbance Voltage Measurement

Operation Mode: #1

Middle Channel (915.25MHz)

Phase

Test Results										
Tested Port	Line	Frequency (MHz)	Value (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	A Value (dBµV)	verage Valı Limit (dBµV)	ue Margin (dB)	Factor total Line P (dB)	
AC Mains	Ρ	0,181	54,36	64,44	10,07	37,51	54,44	16,93	10,82	
AC Mains	Ρ	0,240	48,10	62,10	14,00	32,42	52,10	19,68	10,80	
AC Mains	Ρ	27,429	45,90	60,00	14,10	28,34	50,00	21,66	11,31	
Note: Fa	Note: Factor total = Lisn factor + Cable factor + Pulse limiter factor.									



Report No. 28110821\_024





Final Measurement - Table representation of Mains Terminal Disturbance Voltage Measurement

Operation Mode: #1

Middle Channel (915.25MHz)

Neutral

Test Results										
Tested		Quasi-Peak			A	verage Valu				
Port	Line	Frequency (MHz)	Value (dBµV)	Limit (dBµV)	Margin (dB)	Value (dBµV)	Limit (dBµV)	Margin (dB)	Factor total Line N (dB)	
AC Mains	Ν	0,184	53,57	64,30	10,72	37,68	54,30	16,61	10,82	
AC Mains	Ν	0,244	46,84	61,95	15,11	33,15	51,95	18,80	10,80	
AC Mains	Ν	27,427	45,74	60,00	14,26	28,25	50,00	21,75	11,31	

Note: Factor total = Lisn factor + Cable factor + Pulse limiter factor.



Report No. 28110821\_024





Final Measurement - Table representation of Mains Terminal Disturbance Voltage Measurement

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High Channel (927.25MHz)

Phase

Test Results									
Tested Port	Line	Frequency (MHz)	Value (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	A Value (dBµV)	verage Valı Limit (dBµV)	ue Margin (dB)	Factor total Line P (dB)
AC Mains	Ρ	0,183	53,58	64,33	10,75	36,41	54,33	17,93	10,82
AC Mains	Ρ	0,245	47,50	61,94	14,44	33,28	51,94	18,65	10,80
AC Mains	Р	27,332	45,51	60,00	14,49	28,10	50,00	21,90	11,31
Note: Fa	Note: Factor total = Lisn factor + Cable factor + Pulse limiter factor.								



Report No. 28110821\_024





Final Measurement - Table representation of Mains Terminal Disturbance Voltage Measurement

0	peration	Mode:	#1
<b>U</b>	poration	moao.	

High Channel (927.25MHz)

Neutral

Test Results										
		Quasi-Peak		Average Value						
Line	Frequency (MHz)	Value (dBµV)	Limit (dBµV)	Margin (dB)	Value (dBµV)	Limit (dBµV)	Margin (dB)	Factor total Line N (dB)		
Ν	0,179	51,87	64,52	12,66	36,03	54,52	18,49	10,82		
Ν	0,240	45,93	62,10	16,17	33,25	52,10	18,84	10,80		
Ν	27,427	45,90	60,00	14,10	28,13	50,00	21,87	11,31		
	esult Line N N	LineFrequency (MHz)N0,179N0,240N27,427	esults Line <mark>Frequency (МН2)</mark> N 0,179 51,87 N 0,240 45,93 N 27,427 45,90	esuits       Line     Frequency (MHz)     Value (dBµV)     Limit (dBµV)       N     0,179     51,87     64,52       N     0,240     45,93     62,10       N     27,427     45,90     60,00	Interse     Interse       Line     Frequency (MHz)     Value (dBµV)     Limit (dBµV)     Margin (dB)       N     0,179     51,87     64,52     12,66       N     0,240     45,93     62,10     16,17       N     27,427     45,90     60,00     14,10	esults       Line     Геециепсу (МН2)     Ціті (ДВµV)     Магдіп (ДВµV)       N     0,179     51,87     64,52     12,66     36,03       N     0,240     45,93     62,10     16,17     33,25       N     27,427     45,90     60,00     14,10     28,13	Results       Line     Aurege Value       Frequency (MHz)     Value (dBµV)     Limit (dBµV)     Margin (dB)     Value (dBµV)     Limit (dBµV)       N     0,179     51,87     64,52     12,66     36,03     54,52       N     0,240     45,93     62,10     16,17     33,25     52,10       N     27,427     45,90     60,00     14,10     28,13     50,00	esuitsLine $\mathbb{E}$ $\mathbb{E}$ Line $\mathbb{E}$ $\mathbb{E}$ Margin $\mathbb{C}$ $\mathbb{C}$ $\mathbb{C}$ N0,17951,8764,5212,6636,0354,5218,49N0,24045,9362,1016,1733,2552,1018,84N27,42745,9060,0014,1028,1350,0021,87		

Note: Factor total = Lisn factor + Cable factor + Pulse limiter factor.



11.3 TEST: Radiated Emission		PASS
Parameters required prior to the	Laboratory Ambient Temperatu	ıre (°C) 15 to 35 °C
test	Relative Humidity (%)	30 to 60 %
Parameters recorded during the	Laboratory Ambient Temperatu	ıre (°C) 22°C
test	Relative Humidity (%)	54%
	Air pressure (hPa)	1020
	Power supply and Frequer	ncy Application Point
Fully configured sample tested at the power line frequency	+5 Vdc	Enclosure
Equipment mode:	Operation mode	#1 #2
FCC Standard	§15.205;	§15.209; §15.247
Except as provided elsewhere in thi the field strength levels specified in	s subpart, the emissions from ar the following table :	intentional radiator shall not exceed
$0.009-0.490$ $2400/F(h)$ $0.490-1.705$ $24000/F(h)$ $1.705-30.0$ $30$ $30-38$ $100^{**}$ $88-216$ $150^{**}$ $216-960$ $200^{**}$ Above 960 $500$ **Except as provided in paragraph ( this section shall not be located in the MHz. However, operation within the §§15.231 and 15.241.Remark: In accordance with part 15 300 meters, a correction factor was separation distance. The applied for 3meter) = +80db Extrapolation (dB)	(Hz) (Hz) g), fundamental emissions from the frequency bands 54-72 MHz, se frequency bands is permitted .31 (f) (2), where the measurement applied in order to permit measurement mula for limits at 3 meter is:Extra = 40 log (30 meter / 3 meter) = ±4	300     30     30     30     30     30     31     32     33     33     33     33     33     33     33     33     33     33     33     33     33     33     33     33     33     33     34     35     36     37     38     39     39     30     30     31     32     33     33     33     33     33     34     35     36     37     38     39     39     39     39     39     39     39     39
Further information to test setup. For frequencies above 1GHz, the anechoic material is also placed on the metallic floor between EUT and Antenna	EMI Receiver & Controller	Interna Tower Material Plate



Test Equipment Used								
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due			
CSSA	ETS Lindgren	FACT3	87020484	10/2016	10/2018			
EMI Test Receiver	R&S	ESW44	87020967	06/2017	06/2018			
Loop Antenna	EMCO	6512	87020465	02/2017	02/2020			
Antenna BiConiLog	ETS Lindgren	3124E-PA	87020457	04/2017	04/2020			
Antenna Horn with Preamplifier	ETS Lindgren	3117-PA	87020458	04/2017	04/2020			
Highpass Filter	Wainwright Instr.	WHKX10-1170- 1300	87020800	05/2017	05/2018			
Stabilized Power Supply	Elettrotest	TPS T 30K60S	87020490	09/2015	09/2018			







Report No. 28110821\_024







07/10/2016



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)								
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)			
31,09	15,52	19,97	0,75	Not present	36,24			
902,75 (fundamental)	78,50	25,30	4,07	Not present	107,87			



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)								
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)			
108,01	27,20	11,75	1,81	Not present	40,76			
120,01	20,95	11,55	1,85	Not present	34,35			
194,47	13,97	13,38	2,56	Not present	29,91			
902,75 (fundamental)	73,74	25,30	4,07	Not present	103,11			



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)								
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)			
31,09	13,32	19,97	0,75	Not present	34,04			
108,01	22,03	11,75	1,81	Not present	35,59			
142,66	19,04	11,87	2,15	Not present	33,06			
889,88	-3,36	24,17	4,08	Not present	24,89			
915,25 (fundamental)	78,76	25,30	4,07	Not present	108,13			



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)								
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)			
107,92	25,97	11,75	1,81	Not present	39,53			
120,01	21,16	11,51	1,85	Not present	34,52			
194,32	14,44	13,37	2,25	Not present	30,06			
233,14	6,03	17,23	2,64	Not present	25,90			
915,25 (fundamental)	74,15	25,30	4,07	Not present	103,52			



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)								
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)			
31,15	11,98	19,97	0,75	Not present	32,70			
927,25 (fundamental)	78,51	25,34	4,03	Not present	107,88			



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)								
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)			
108,01	27,10	11,75	1,81	Not present	40,66			
119,98	20,81	11,51	1,85	Not present	34,17			
194,80	12,18	13,37	2,25	Not present	27,80			
927,25 (fundamental)	74,12	25,34	4,03	Not present	103,49			


Graphical representation of Radiated Emission Measurement										
Operat	tion Mode: #1									
Frequency	/: 1GHz – 10GHz									
Antenna Polarization: Vertical										
Low Channel (902.75MHz)										
MultiView 🕀 Receiver 🖾 Spectrum 🔆 🖾 Meas BW (6dB) 1 MHz Meas Time 100 ms		▽								
Att 0 dB Preamp Off Step TD Scan Input 1 AC PS On Notch Off TDF Input1 "EMI RAD 1-18GHz" I Bargraph		Frequency <b>10.0000000 GHz</b>								
Max Peak 47.51 dBµV/m -10 0 10	20 30 40 50	60 70 80 90								
2 Scan 80 dBµV/m		● 1Pk Max ● 2Av Max M4[1] 46.30 dBµV/m 4.518750000 GHz M1[1] 41.61 dBµV/m 1.805500000 GHz								
60 dBµV/m	Mi	MS								
40 dBµV/m 30 dBµV/m	MB war									
20 dBµV/m-	Ranne 3	1								
Start 1.0 GHz 3 Marker Table		Stop 10.0 GHz								
WndTypeRefTrcScanM11ScanM21ScanM31ScanM41ScanM51	X-value 1.8055 GHz 2.70825 GHz 3.61075 GHz 4.51875 GHz 5.41175 GHz	Y-value 41.61 dBµV/m 44.92 dBµV/m 43.83 dBµV/m 46.3 dBµV/m 45.89 dBµV/m								

			PEAK R	RESULT (RE	3W=1MHz)					
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin		
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)		
1805,50	49,49	30,60	44,50	6,02	41,61	no	87,87*	46,26		
2708,25	49,68	32,64	44,80	7,40	44,92	yes	74,00	29,08		
3610,75	45,06	33,15	43,50	9,12	43,83	yes	74,00	30,17		
4518,75	44,86	33,89	43,60	11,15	46,30	yes	74,00	27,70		
5411,75	43,39	34,59	43,40	11,31	45,89	yes	74,00	28,11		
*=fundame N.B. = all p	*=fundamental level (QP) in Vertical polarization – 20dB N B = all peak levels measured are under par 15 209 average limit (54 dBuV/m)									



Graphical representation of Radiated Emission Measurement										
	Operati	on Mode: #1								
	Frequency:	1GHz – 10GHz								
Antenna Polarization: Horizontal										
	Low Chanr	nel (902.75MHz)								
MultiView 😁 Receiver 🛛 Spect	trum 🧚 🖾									
Meas BW         (6dB) 1 MHz         Meas Time 100 ms           Att         0 dB         Preamp         Off           Input         1 AC         PS         Or           TDF Input1 "EMI RAD 1-18GHz"         1 AC         PS	s f <b>Step</b> TD Scan n <b>Notch</b> Off			Frequency 10	0.0000000 GHz					
Max Peak <b>47.26</b> dBµV/m -5	10 20	30 40	50 60	70	80 95					
2 Scan 80 dbµV/m FCC 1-196HZ PK				M5[1] M1[1]	1Pk Max 2Av Max 46.04 dBμV/m 5.410500000 GHz 41.10 dBμV/m 1.805250000 GHz					
60 dBµV/m										
40 dBµV/m	M2 Aman made and a second second	M3	MA MS	-	man and man when					
30 dBµV/m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		undan							
20 dBµV/m		Range 3			TF					
Start 1.0 GHz		Hange J			Stop 10.0 GHz					
3 Marker Fable       Wnd     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc         1           1         1           1         1           1         1           1         1	X-value 1.80525 GHz 2.708 GHz 3.607 GHz 4.514 GHz 5.4105 GHz		Y-v 41.1 d 43.02 d 43.63 d 46.43 d 46.04 d	alue BµV/m BµV/m BµV/m BµV/m BµV/m BµV/m					

			PEAK R	RESULT (RE	3W=1MHz)			
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)		(dBµV/m)	(dB)
1805,25	48,98	30,60	44,50	6,02	41,10	no	83,11*	42,01
2708,00	47,78	32,64	44,80	7,40	43,02	yes	74,00	30,98
3607,00	44,86	33,15	43,50	9,12	43,63	yes	74,00	30,37
4514,00	44,99	33,89	43,60	11,15	46,43	yes	74,00	27,57
5410,50	43,54	34,59	43,40	11,31	46,04	yes	74,00	27,96
*=fundame N.B. = all p	ntal level (C eak levels r	QP) in Horizo measured a	ontal polariz re under par	ation – 20dl 15.209 ave	3 erage limit (54	4 dBµV/m)		



Graphica	Graphical representation of Radiated Emission Measurement									
Operation Mode: #1										
	Frequency	: 1GHz – 10GHz								
	Antenna Po	larization: Vertical								
Middle Channel (915.25MHz)										
MultiView Receiver Meas BW (6dB) 1 MHz Meas Time 100 Att 0 dB Preamp Input 1 AC PS TDF Input1 "EMI RAD 1-18GHz" Space State	ectrum ≱⊠ oms Off Step TD Scan On Notch Off			Frequency <b>10.0000</b>	⊽ 0000 GHz					
Max Peak <b>47.34</b> dBµV/m <sup>-5</sup>	10 20	30 40 50	60	70 80	95					
2 Scan 80 dBµV/m				•1Pk Max M5[1] 45 5.4860 M1[1] 40 1.8307	€ 2Av Max .71 dBµV/m 000000 GHz .36 dBµV/m 750000 GHz.					
60 dBµV/m	M2	M3 M4	MS							
40 dBµV/m alan and an	Annon markaliner									
20 dBµV/m-		Range 3			TF					
Start 1.0 GHz       3 Marker Table       Wnd     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc   1 1 1 1 1 1	X-value 1.83075 GHz 2.74575 GHz 3.6575 GHz 4.582 GHz 5.486 GHz		Y-value           40.36 dBμV/i           46.19 dBμV/i           43.4 dBμV/i           45.26 dBμV/i           45.71 dBμV/i	p 10.0 GHz					

			PEAK R	RESULT (RE	3W=1MHz)			
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)
1830,75	48,68	30,14	44,50	6,04	40,36	no	88,13*	47,77
2745,75	50,97	32,62	44,80	7,40	46,19	yes	74,00	27,81
3657,50	44,71	33,02	43,50	9,17	43,40	yes	74,00	30,60
4582,00	43,90	33,81	43,60	11,15	45,26	yes	74,00	28,74
5486,00	43,07	34,59	43,40	11,35	45,71	no	88,13*	42,42
*=fundame N.B. = all p	ntal level (C eak levels r	P) in Vertic	al polarization re under par	on – 20dB 15.209 ave	erage limit (54	1 dBµV/m)		



Graphical representa	Graphical representation of Radiated Emission Measurement								
	Operation Mode: #1								
Fre	quency: 1GHz – 10G	iHz							
Antenna Polarization: Horizontal									
Middle Channel (915.25MHz)									
MultiView     Receiver     Spectrum     *       Meas BW     (6dB) 1 MHz     Meas Time 100 ms       Att     0 dB     Preamp     Off       Stopp 100     1 AC     PS     On       Notch     TDF Input1 "EMI RAD 1-18GHz"	تع Gcan Off		Frequency         10.0000000 GHz						
Max Peak <b>47.87</b> dBµV/m -5 10	20 30 4	0 50 60	70 80 95						
2 Scan 80 dBµV/m FCC 1-19GHZ PK 60 dBµV/m FCC 1-19GHZ AV 50 uBµV/m M1 40 dBµV/m 30 dBµV/m M1 40 dBµV/m M1 M1 M1 M1 M1 M1 M1 M	M2 M3	M4 Mb	●1Pk Max●2Av Max M5[1] 45.70 dBµV/m 5.484000000 GHz M1[1] 40.41 dBµV/m 1.828750000 GHz						
20 dBµV/m Start 1.0 GHz 3 Marker Table Wnd Type Ref Trc	Range 3		TF Stop 10.0 GHz						
Scan         M1         1           Scan         M2         1           Scan         M3         1           Scan         M4         1           Scan         M5         1	1.82875 ( 2.74575 ( 3.6595 ( 4.58225 ( 5.484 (	anz GHZ GHZ GHZ GHZ	40,41 dbµV/m 43,53 dbµV/m 43,69 dbµV/m 45,43 dbµV/m 45,7 dbµV/m						

			PEAK R	RESULT (RE	3W=1MHz)					
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin		
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)		
1828,75	48,73	30,14	44,50	6,04	40,41	no	83,52*	43,11		
2745,75	48,31	32,62	44,80	7,40	43,53	yes	74,00	30,47		
3659,50	45,00	33,02	43,50	9,17	43,69	yes	74,00	30,31		
4582,25	44,07	33,81	43,60	11,15	45,43	yes	74,00	28,57		
5484,00	43,16	34,59	43,40	11,35	45,70	no	83,52*	37,82		
*=fundame N.B. = all p	*=fundamental level (QP) in Horizontal polarization – 20dB N B = all peak levels measured are under par 15 209 average limit (54 dBuV/m)									



Graphical representation of Radiated Emission Measurement										
	Operation Mode: #1									
Frequency: 1GHz – 10GHz										
	Antenna Polarization: Vertical									
High Channel (927.25MHz)										
MultiView E Receiver Sp Meas BW (6dB) 1 MHz Meas Time 100 Att 0 dB Preamp	ectrum ≱⊠ Dms Off Step TD Scan			Frequenc						
TDF Input1 "EMI RAD 1-18GHz" 1 Bargraph Dkt 57 36 dBuV/m 57.8	2 781 7500 GHz -5	10 20	30 40	50 60	70 80 95					
AV <b>53.47</b> dBµV/m 53.5	2.7817500 GHz -5	10 20	30 40	50 60	70 80 95					
2 Scan 80 dBµV/m- FCC 1-18GHZ PK 70 uBµy/in-				M5 M1	<ul> <li>1Pk Max 2Av Max</li> <li>45.85 dBµV/m</li> <li>5.570250000 GHz</li> <li>41.50 dBµV/m</li> <li>1.854500000 GHz</li> </ul>					
60 dBµV/m FCC 1-18GHZ AV 50 авµv/m М1	M2	MJ	M4	M5	when the water and the second					
40 dB/W/m-										
20 dBµV/m	TF	Range 3								
Start 1.0 GHz		Kange o			Stop 10.0 GHz					
With Mode     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc         1           1         1           1         1           1         1           1         1	X-value 1.8545 G 2.78175 G 3.709 G 4.63625 G 5.57025 G	iHz iHz iHz iHz iHz	41. 57.6 49.6 48.7 45.8	Y-value 5 dBµV/m 6 dBµV/m 7 dBµV/m 7 dBµV/m 5 dBµV/m					



			PEAK R	ESULT (RE	3W=1MHz)			
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)
1854,50	49,34	30,60	44,50	6,06	41,50	no	87,88*	46,38
2781,75	62,28	32,84	44,80	7,48	57,80	yes	74,00	16,20
3709,00	50,85	33,10	43,50	9,22	49,67	yes	74,00	24,33
4636,25	47,40	33,82	43,60	11,15	48,77	yes	74,00	25,23
5570,25	43,24	34,59	43,40	11,42	45,85	no	87,88*	42,03
*=fundame	ntal level (C	(P) in Vertic	al polarizatio	on – 20dB				

AVERAGE RESULT (RBW=1MHz)										
Frequency	Reading value	Antenna Factor	tenna Pre-Amp. Cable Correcting Restricted AV Limit Marg							
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)		
2781,75	57,98	32,84	44,80	7,48	53,50	yes	54,00	0,50		
N.B. = all o	thers peak	levels meas	ured are un	der par.15.2	209 average l	imit (54 dBµ	ıV/m)			



Graphical representation of Radiated Emission Measurement											
	Operation Mode: #1										
Frequency: 1GHz – 10GHz											
Antenna Polarization: Horizontal											
High Channel (927.25MHz)											
MultiView     Receiver     Sp       Meas BW     (6dB) 1 MHz     Meas Time 100       Att     0 dB     Preamp       Input     1 AC     PS       TDF Input1 "EMI RAD 1-18GHz"     1	ectrum ≱⊠ Oms Off Step TD Scan On Notch Off				Frequency	2.7817500 GHz					
Pk+ <b>54.92</b> dBµV/m 55.1	2.7817500 GHz -10	0 10	20 30	40 50	0 60	70 80 90					
AV 50.62 dBµV/m 50.6	2.7817500 GHz -10	0 10	20 30	40 50	0 60	70 80 90					
2 Scan 80 dBµV/m					M5[1 M1[1	1Pk Max 2Av Max ] 45.23 dBμV/m 5.565000000 GHz ] 44.43 dBμV/m _1.854500000 GHz					
60 dBµV/m	M2		M4								
FCC 1-18GHZ AV 150 авруут М1 Т	a survey was	Ma	monor	M5	man	- warmen marked					
40 dBµV/m			monda								
30 dBµV/m											
20 dBµV/m	TF										
Start 1.0.CHz		Range 3			. <u>i</u>	Stop 10.0 GHz					
Wnd     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc   1 1 1 1 1 1	X-value 1.8545 ( 2.78175 ( 3.709 ( 4.63625 ( 5.565 (	iHz iHz iHz iHz iHz iHz		44.43 54.95 47.13 52.04 45.23	value dBµV/m dBµV/m dBµV/m dBµV/m dBµV/m					



PEAK RESULT (RBW=1MHz)										
Frequency	y Reading Antenna Pre-Amp. Cable Correcting Restricted F value Factor Gain Loss reading band (A						PK Limit (AV Limit + 20dB)	Margin		
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)		
1854,50	52,27	30,60	44,50	6,06	44,43	no	83,49*	39,06		
2781,75	59,58	32,84	44,80	7,48	55,10	yes	74,00	18,90		
3709,00	48,31	33,10	43,50	9,22	47,13	yes	74,00	26,87		
4636,25	50,67	33,82	43,60	11,15	52,04	yes	74,00	21,96		
5565,00	42,62	34,59	43,40	11,42	45,23	no	83,49*	38,26		
*=fundame	ntal level (C	P) in Horizo	ontal polariz	ation – 20dł	3					

AVERAGE RESULT (RBW=1MHz)									
Frequency	Reading valueAntenna FactorPre-Amp. GainCable LossCorrecting readingRestricted bandAV LimitMargin								
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)	
2781,75	55,08	32,84	44,80	7,48	50,60	yes	54,00	3,40	
N.B. = all o	N.B. = all others peak levels measured are under par.15.209 average limit (54 dBµV/m)								



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)									
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)				
31,00	13,70	19,97	0,75	Not present	34,42				
81,22	12,13	11,18	1,62	Not present	24,93				
108,04	14,89	11,75	1,81	Not present	28,45				
141,88	19,83	11,87	2,15	Not present	33,85				
902,75 (fundamental)	72,35	25,30	4,07	Not present	101,72				



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)									
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)				
108,01	27,36	11,75	1,81	Not present	40,92				
194,47	14,35	13,37	2,25	Not present	29,97				
802,77	6,60	24,57	4,05	Not present	35,22				
902,75 (fundamental)	73,44	25,30	4,07	Not present	102,81				



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)									
Frequency	Reading value	Antenna Factor	Cable Loss	Pre-Amp. Gain	Correcting reading				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)				
30,24	13,24	19,97	0,75	Not present	33,96				
108,07	16,62	11,75	1,81	Not present	30,18				
142,33	19,06	11,87	2,15	Not present	33,08				
164,35	11,02	13,73	2,34	Not present	27,09				
915,25 (fundamental)	72,70	25,30	4,07	Not present	102,07				



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)									
Frequency	Reading Antenna value Factor		Cable Loss	Pre-Amp. Gain	Correcting reading				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)				
107,98	27,39	11,75	1,81	Not present	40,95				
194,50	13,72	13,37	2,25	Not present	29,34				
815,25	1,15	24,70	4,06	Not present	29,91				
915,25 (fundamental)	73,80	25,30	4,07	Not present	103,17				



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)									
Frequency	Reading value	Antenna Factor	Antenna Cable Factor Loss		Correcting reading				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)				
31,03	13,46	19,97	0,75	Not present	34,18				
108,70	16,85	11,75	1,81	Not present	30,41				
911,60	-3,55	25,30	4,07	Not present	25,82				
927,25 (fundamental)	76,70	25,30	4,07	Not present	106,07				



Report No. 28110821\_024



QUASI-PEAK RESULT (RBW=120kHz)									
Frequency	Reading value	ing Antenna Cable le Factor Loss		Pre-Amp. Gain	Correcting reading				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)				
107,98	26,99	11,75	1,81	Not present	40,55				
194,89	14,47	13,37	2,25	Not present	30,09				
827,01	-3,81	24,70	4,06	Not present	24,95				
927,25 (fundamental)	76,68	25,30	4,07	Not present	106,05				



Graphical representation of Radiated Emission Measurement										
	Operation Mode: #2									
	Frequency: 1GHz – 10GHz									
	Antenna Po	olarization: Ve	rtical							
Low Channel (902.75MHz)										
MultiView (6dB) 1 MHz Meas Time 100 Att 0 dB Preamp Input 1 AC PS TDF Input1 "EMI RAD 1-18GHz"	e <b>ctrum ≱⊠</b> ms Off <b>Step</b> TD Scan On <b>Notch</b> Off			v           Frequency <b>10.0000000 GHz</b>						
Max Peak <b>47.41</b> dBµV/m <sup>-10</sup>	0 10	20 30	40 50	60 70 80 90						
2 Scan				●1Pk Max●2Av Max						
80 dBµV/m				M5[1] 45.60 dBµV/m 5.417500000 GHz ————————————————————————————————————						
60 dBµV/m	M2	MB								
FCC 1-18GHZ AV	and and the second	unionantenant	M4	MB						
40 dBµV/m and the second second the second			manna							
20 dBµV/m-										
		Range 3		ТЕ						
Start 1.0 GHz				Stop 10.0 GHz						
Wind     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc   1 1 1 1 1	X-valu 1.8055 2.70825 3.611 4.51375 5.4175	e GHz GHz GHz GHz GHz GHz	Y-value 45.18 dBμV/m 51.56 dBμV/m 50.96 dBμV/m 49.18 dBμV/m 45.6 dBμV/m						

	PEAK RESULT (RBW=1MHz)									
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin		
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)		
1805,50	53,06	30,60	44,50	6,02	45,18	no	81,72*	36,54		
2708,25	56,32	32,64	44,80	7,40	51,56	yes	74,00	22,44		
3611,00	52,19	33,15	43,50	9,12	50,96	yes	74,00	23,04		
4513,75	47,74	33,89	43,60	11,15	49,18	yes	74,00	24,82		
5417,50	43,10	34,59	43,40	11,31	45,60	yes	74,00	28,40		
*=fundame N.B. = all p	ntal level (C eak levels r	P) in Vertic	al polarization re under par	on – 20dB 15.209 ave	erage limit (54	1 dBµV/m)				



Graphical representation of Radiated Emission Measurement										
	Operation Mode: #2									
	Frequency: 1GHz – 10GHz									
	Antenna Polarization: Horizontal									
	Low	Channel (902.	75MHz)							
MultiView  Receiver	Spectrum 👹 🗶									
Att 0 dB Preamp Input 1 AC PS TDF Input1"EMI RAD 1-18GHz"	Off Step TD Sca On Notch O	n ff			Frequency	10.00000	00 GHz			
Max Peak <b>47.31</b> dBµV/m	ן -5 10	20 30	40	50 60	70	80	95			
2 Scan						●1Pk Max●	2Av Max			
80 dBµV/m					M5[] M1[]	1] 45.21 5.416750 1] 46.36 1.805500	. dBµV/m )000 GHz i dBµV/m )000 GHz			
FCC 1-18GHZ PK										
60 dBµV/m		M2								
FCC 1-18GHZ AV	1		MD CM	M5						
40 dBµV/m	and the second	un marken marken	Jummun	-low on a start water and	grather and a straight and	- martine marth				
30 dBuV/m				hanna		~~~~	~~~~~			
20 dBµV/m										
		Range 3					TF			
Start 1.0 GHz						Stop 1	0.0 GHz			
3 Marker Table Wnd Type Rei	f Trc		X-value		V	-value				
Scan M1 Scan M2 Scan M3 Scan M4 Scan M5		1.8 2.70 3 4.51 5.41	055 GHz 825 GHz 611 GHz 375 GHz 675 GHz		46.36 51.52 46.52 49.87 45.21	dBµV/m dBµV/m dBµV/m dBµV/m dBµV/m				
	1	5.41				aph Alu				

	PEAK RESULT (RBW=1MHz)									
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin		
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)		(dBµV/m)	(dB)		
1805,50	51,24	30,60	44,50	6,02	43,36	no	82,81*	39,45		
2708,25	56,28	32,64	44,80	7,40	51,52	yes	74,00	22,48		
3611,00	47,75	33,15	43,50	9,12	46,52	yes	74,00	27,48		
4513,75	48,43	33,89	43,60	11,15	49,87	yes	74,00	24,13		
5416,75	42,71	34,59	43,40	11,31	45,21	yes	74,00	28,79		
*=fundame N.B. = all p	ntal level (C eak levels r	QP) in Horizo measured a	ontal polariz re under par	ation – 20dľ 15.209 ave	3 erage limit (54	4 dBµV/m)				



Graphical representation of Radiated Emission Measurement										
	Ope	eration Mode: #2								
	Freque	ncy: 1GHz – 10G	Hz							
	Antenna	Polarization: Ver	tical							
	Middle C	Channel (915.25N	1Hz)							
MultiView 🗄 Receiver 🛛 🖾	Spectrum 🤾 🗵									
Meas BW         (6dB) 1 MHz         Meas Time           Att         0 dB         Preamp           Input         1 AC         PS           TDF Input1         1-AC         PS	100 ms Off <b>Step</b> TD Scan On <b>Notch</b> Off			Frequency 2.7457500 GHz						
1 Bargraph Pk+ <b>54.21</b> dBµV/m 54.	5 2.7457500 GHz	-5 10 20	30 40 50	60 70 80 95						
AV 50.14 dBµV/m 50.	2 2.7457500 GHz	-5 10 20	<b>30 40 5</b> 0	60 70 80 95						
2 Scan 80 dBµV/m				●1Pk Max ●2Av Max M5[1] 44.90 dBµV/m 5.485500000 GHz M1[1] 49.50 dBµV/m 						
60 dBµV/m FCC 1-186HZ AV 50 dbµv/m	1 	2 M3	M4							
40 dBju//m 		when the second s								
20 dBµV/m-	- 	F								
Start 1.0 GHz		Range 3		Stop 10.0 GHz						
3 Marker Table       Wnd     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc	X-value 1.8305 G 2.74575 G 3.661 G 4.57625 G 5.4855 G	Hz Hz Hz Hz Hz	Y-value 49.5 dBµV/m 54.43 dBµV/m 53.91 dBµV/m 50.97 dBµV/m 44.9 dBµV/m						



			PEAK R	ESULT (RE	3W=1MHz)				
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin	
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)	
1830,50	57,82	30,14	44,50	6,04	49,50	no	82,07*	32,57	
2745,75	59,28	32,62	44,80	7,40	54,50	yes	74,00	19,50	
3661,00	55,22	33,02	43,50	9,17	53,91	yes	74,00	20,09	
4576,25	49,61	33,81	43,60	11,15	50,97	yes	74,00	23,03	
5485,50	42,36	34,59	43,40	11,35	44,90	no	82,07*	37,17	
*=fundamental level (QP) in Vertical polarization – 20dB									

	AVERAGE RESULT (RBW=1MHz)											
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	AV Limit	Margin				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)				
2745,75	54,98	32,62	44,80	7,40	50,20	yes	54,00	3,80				
3661,00	3661,00 50,91 33,02 43,50 9,17 <b>49,60</b> yes 54,00 4,40											
N.B. = all others peak levels measured are under par.15.209 average limit (54 dBµV/m)												



Graphical representation of Radiated Emission Measurement										
	Op	eration M	ode: #2							
	Freque	ncy: 1GH	lz – 10GHz							
	Antenna I	Polarizati	on: Horizon	tal						
	Middle (	Channel (	915.25MHz	)						
MultiView B Receiver Meas BW (6dB) 1 MHz Meas Tim Att 0 dB Preamp Input 1 AC PS TDF Input1 "EMI RAD 1-18GHz"	Bpectrum ↓ ■ 100 ms Off Step TD Scan On Notch Off				Frequenc	⊽ 2.7457500 GHz				
1 Bargraph Pk+ <b>55.69</b> dBµV/m 56	5.0 2.7457500 GHz	-10 0	10 20	30 40	50 60	70 80 90				
AV 51.87 dBµV/m 51	9 2.7457500 GHz	-10 0	10 20	30 40	<b>50</b> 60	70 80 90				
2 Scan 80 dBµV/m					M8 M1	●1Pk Max ● 2Av Max 5[1] 45.21 dBµV/m 5.490000000 GHz [1] 45.18 dBµV/m 1.83050000 GHz				
60 dBµV/m	M1		Ma	M4	15 Sumpervision - Marine					
40 dbpv/m 30 dbpv/m				~~~~						
20 dBµV/m	1	F Range 3								
Start 1.0 GHz						Stop 10.0 GHz				
3 Marker Lable       Wnd     Type     Re       Scan     M1     Scan       Scan     M2     Scan       Scan     M3     Scan       Scan     M4     Scan	ef Trc 1 1 1 1 1 1 1 1	2	X-value 1.8305 GHz 2.74575 GHz 3.661 GHz 1.57625 GHz 5.49 GHz		45.1 55.8 51.3 52.2 45.2	Y-value 8 dBµV/m 4 dBµV/m 9 dBµV/m 8 dBµV/m 1 dBµV/m				



	PEAK RESULT (RBW=1MHz)											
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)				
1830,50	53,50	30,14	44,50	6,04	45,18	no	83,17*	37,99				
2745,75	60,78	32,62	44,80	7,40	56,00	yes	74,00	18,00				
3661,00	52,70	33,02	43,50	9,17	51,39	yes	74,00	22,61				
4576,25	50,92	33,81	43,60	11,15	52,28	yes	74,00	21,72				
5490,00	42,67	34,59	43,40	11,35	45,21	no	83,17*	37,96				
*=fundamental level (QP) in Horizontal polarization – 20dB												

AVERAGE RESULT (RBW=1MHz)											
Frequency	Reading value       Antenna Factor       Pre-Amp. Gain       Cable Loss       Correcting reading       Restricted band       AV Limit       Margin										
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)			
2745,75	56,68	32,62	44,80	7,40	51,90	yes	54,00	2,10			
N.B. = all others peak levels measured are under par.15.209 average limit (54 dBµV/m)											



Graphical representation of Radiated Emission Measurement												
		Ope	erati	on Mode:	#2							
		Freque	ncy	: 1GHz –	10G	Hz						
		Antenna	Po	larization:	Ver	tical						
		High Cł	nan	nel (927.2	5Mł	Hz)						
MultiView Receiver Meas BW (6dB) 1 MHz Meas Att 0 dB Preas Input 1 AC PS TDF Input1 "EMI RAD 1-18GHz"	Spe Time 100	ectrum 🔆 🗵 ms Off Step TD Scan On Notch Off							Fre	equency	1.854	⊽ 5000 GHz
1 Bargraph Pk+ <b>56,64</b> dBuV/m	56.9	1.8545000 GHz	-10	0 10		20	30	40	50	60	70	80 90
AV 53.41 dBµV/m	53.4	1.8545000 GHz	-10	0 10		20	30	40	50	60	70	80 90
2 Scan 80 dBµV/m										M5[ M1[	● 1Pk M 1] 4 5.560 1] 5 1.854	ax ● 2Av Max 5.90 dBµV/m 0250000 GHz 6.83 dBµV/m 4500000 GHz
60 dBµV/m		4	12 V	1	43		M4					
40 dBµV/m		Johnannennen			low	www.www.www.	mln	common and the		har	······	
30 dBµV/m	methon		<u> </u>									
	T,F			Range 3								
Start 1.0 GHz											St	op 10.0 GHz
3 Marker Lable       Wnd     Type       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Ref	Trc           1           1           1           1           1           1           1           1		×- 1.85 2.781 3.7 4.636 5.560	value 45 G 75 G 09 G 25 G 25 G	Hz Hz Hz Hz Hz				56.83 54.92 53.1 49.65 45.9	-value dBµV/ dBµV/ dBµV/ dBµV/ dBµV/	m m m m m m



			PEAK R	ESULT (RE	3W=1MHz)				
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin	
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)	
1854,50	64,67	30,60	44,50	6,06	56,83	no	86,07*	29,24	
2781,75	59,40	32,84	44,80	7,48	54,92	yes	74,00	19,08	
3709,00	54,28	33,10	43,50	9,22	53,10	yes	74,00	20,90	
4636,25	48,28	33,82	43,60	11,15	49,65	yes	74,00	24,35	
5560,25	46,29	34,59	43,40	11,42	45,90	no	86,07*	40,17	
*=fundame	*=fundamental level (QP) in Vertical polarization – 20dB								

	AVERAGE RESULT (RBW=1MHz)											
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	AV Limit	Margin				
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)				
2781,75	55,08	32,84	44,80	7,48	50,60	yes	54,00	3,40				
3709,00	3709,00 49,08 33,10 43,50 9,22 <b>47,90</b> yes 54,00 6,10											
N.B. = all others peak levels measured are under par 15.209 average limit (54 dBµV/m)												



Graphical representation of Radiated Emission Measurement									
	Оре	eration N	lode: #2						
	Freque	ncy: 1Gł	lz – 100	θHz					
	Antenna F	Polarizati	on: Hori	zontal					
	High Ch	nannel (§	)27.25M	Hz)					
MultiView Receiver Meas BW (6dB) 1 MHz Meas Time 10 Att 0 dB Preamp Input 1 AC PS TDF Input1 "EMI RAD 1-18GHz"	D <b>ectrum ≹⊠</b> Oms Off <b>Step</b> TD Scan On <b>Notch</b> Off					Fr	equency	2.781	.7500 GHz
1 Bargraph Pk+ <b>56-89</b> dBuV/m 57.0	2 7817500 GHz	-10 0	10	20	30 40	50	60	70	80 90
AV <b>53.36</b> dBµV/m 53.4	2.7817500 GHz	-10 0	10	20	30 40	50	60	70	80 90
2 Scan 80 dBµV/m							M5[1	• 1Pk Ma ] 4 5.565 ] 5 1.854	ax • 2Av Max 4.80 dBµV/m 5250000 GHz 1.54 dBµV/m 4500000 GHz
60 dBµV/m FCC 1-18GHZ AV 50 авµv/m		1 <u>2</u>	M3	unparante	M4	45		and the second	and the second sec
40 dBµV/m 30 dBµV/m-	and the second and the second s						and and and		
20 dBµV/m-	1	F							
Start 1.0 GHz		Range 3						St	op 10.0 GHz
Wind     Type     Ref       Scan     M1       Scan     M2       Scan     M3       Scan     M4       Scan     M5	Trc         1           1         1           1         1           1         1           1         1           1         1           1         1	:	X-value 1.8545 ( 2.78175 ( 3.709 ( 4.63625 ( 5.56525 (	GHZ GHZ GHZ GHZ GHZ GHZ			۲- 51.54 56.75 51.99 50.59 44.8	value dBµV/ dBµV/ dBµV/ dBµV/ dBµV/	m m m m m



	PEAK RESULT (RBW=1MHz)										
Frequency	Reading value	Antenna Factor	Pre-Amp. Gain	Cable Loss	Correcting reading	Restricted band	PK Limit (AV Limit + 20dB)	Margin			
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)			
1854,50	59,38	30,60	44,50	6,06	51,54	no	86,05*	34,51			
2781,75	61,48	32,84	44,80	7,48	57,00	yes	74,00	17,00			
3709,00	53,17	33,10	43,50	9,22	51,99	yes	74,00	22,01			
4636,25	49,22	33,82	43,60	11,15	50,59	yes	74,00	23,41			
5565,25	42,19	34,59	43,40	11,42	44,80	no	86,05*	41,25			
*=fundame	*=fundamental level (QP) in Horizontal polarization – 20dB										

AVERAGE RESULT (RBW=1MHz)											
Frequency	Reading value     Antenna Factor     Pre-Amp. Gain     Cable Loss     Correcting reading     Restricted band     AV Limit     Margin										
(MHz)	(dBµV)	(dB3/m)	(dB)	(dB)	(dBµV/m)	1	(dBµV/m)	(dB)			
2781,75	54,88	32,84	44,80	7,48	53,40	yes	54,00	0,60			
N.B. = all others peak levels measured are under par.15.209 average limit (54 dBµV/m)											



11.4 TEST: 20dB Bandwidth   PASS						
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C				
test	Relative Humidity (%)	30 to 60 %				
Parameters recorded during the	Laboratory Ambient Temperature (°C)	24°C				
test	Relative Humidity (%)	48%				
	Air pressure (hPa)	1020				
_	Power Supply & Frequency	Application Point				
Fully configured sample tested at the power line frequency	+5V dc	RF Connector				
Equipment mode:	Operation mode	#3				
FCC Standard	§15.247 (	47 (A)				
Limit: None; for reporting purpose o	nly					
Further information to test setup	EUT Attenuator (optional)	Spectrum Analyzer (or Power Meter)				



Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU40	87020455	04/2017	04/2018



Channel (No.)	Frequency (MHz)	Channel Bandwidth at -20dB (kHz)	Limit (kHz)	Plot (No.)
1 (Low)	902,75	75,64		1





Channel (No.)	Frequency (MHz)	Channel Bandwidth at -20dB (kHz)	Limit (kHz)	Plot (No.)
25 (Middle)	915,25	76,28		2





Channel (No.)	Frequency (MHz)	Channel Bandwidth at -20dB (kHz)	Limit (kHz)	Plot (No.)	
50 (High)	927,25	75,00		3	



11.5 TEST: RF power output, radiated (EIRP)				
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C		
test	Relative Humidity (%)	30 to 60 %		
Parameters recorded during the	Laboratory Ambient Temperature (°C)	22,5°C		
test	Relative Humidity (%)	51%		
	Air pressure (hPa)	1020		
	Power Supply & Frequency	Application Po	pint	
Fully configured sample tested at the power line frequency	+5V dc	RF Connect	or	
Equipment mode:	Operation mode	#1		
FCC Standard	§15.247 (B) (2)			

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 nonoverlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Further information to test setup			[]	
	EUT	Attenuator (optional)	Spectrum Analyzer (or Power Meter)	



Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU40	87020455	04/2017	04/2018



Channel (No.)	Frequency (MHz)	Conducted Output Power		Conducted Output Power		Limit (W)	
(100.)	(11112)	(dBm)	(mW)				
1 (Low)	902,75	17,09	51,16	1			

	Measured Radiated ERP					
Channel (No.)	Frequency (MHz)	Max. Radiated Output Power (at 3m. distance)	ERP		Limit (W)	
		(dBµV/m)	(dBm)	(mW)		
1 (Low)	902,75	107,87	10,49	11,20	4	





Channel (No.)	Frequency (MHz)	Conducted Output Power		Conducted Output Power		Limit (W)
(10.)	(11112)	(dBm)	(mW)			
25 (Middle)	915,25	17,08	51,05	1		

Measured Radiated ERP					
Channel (No.)	Frequency (MHz)	Max. Radiated Output Power (at 3m. distance)	ERP		Limit (W)
		(dBµV/m)	(dBm)	(mW)	
25 (Middle)	915,25	108,13	10,75	11,89	4



Report No. 28110821\_024



Channel (No.)	Frequency (MHz)	Conducted Output Power		Limit (W)
		(dBm)	(mW)	
50 (High)	927,25	17,00	50,11	1

Measured Radiated ERP						
Channel (No.)	Frequency (MHz)	Max. Radiated Output Power (at 3m. distance)	ERP		Limit (W)	
		(dBµV/m)	(dBm)	(mW)		
50 (High)	927,25	107,88	10,50	11,22	4	



11.6 TEST: Out-of-band emissions				
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C		
test	Relative Humidity (%)	30 to 60 %		
Parameters recorded during the	Laboratory Ambient Temperature (°C)	22°C		
test	Relative Humidity (%)	50%		
	Air pressure (hPa) 1020			
	Power Supply & Frequency Application		pint	
Fully configured sample tested at the power line frequency	+5V dc	RF Connector		
Equipment mode:	Operation mode	#3		
FCC Standard	§15.247 (D)			

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Further information to test setup	<b></b>		[]	
	EUT	Attenuator (optional)	Spectrum Analyzer (or Power Meter)	



Test Equipment Used						
Description         Manufacturer         Model         Identifier         Calibration date         Calibratio due						
EMI Test Receiver	R&S	ESU40	87020455	04/2017	04/2018	
Highpass Filter	Wainwright Instr.	WHKX10- 1170-1300	87020800	05/2017	05/2018	





Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
804,13	-45,69		62,70		42,70
2535,25	-48,00	+17,01	65,01	2.00	45,01
3038,46	-45,43		62,44	-2,99	42,44
6807,69	-46,83		63,84		43,84



Report No. 28110821\_024



Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
816,57	-44,07		61,21		41,21
1012,82	-46,58	+17,14	63,72	2.96	43,72
3197,11	-46,61		63,75	-2,00	43,75
8089,74	-47,25		64,39		44,39




Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
827,45	-45,39		62,43		42,43
1025,64	-47,49	+17.04	64,53	-2,96	44,53
3052,88	-46,33	+17,04 -	63,37		43,37
8525,74	-47,75		64,79		44,79



1.7 TEST: 100 kHz Bandwidth of Frequency Band Edges PASS					
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C			
test	Relative Humidity (%)	30 to 60 %			
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	21°C			
	Relative Humidity (%)	52%			
	Air pressure (hPa)	1020			
	Power Supply & Frequency	Application Po	pint		
Fully configured sample tested at the power line frequency	+5V dc	RF Connect Enclosure	or		
Equipment mode:	Operation mode	#1 #2 #3 #4	1		
FCC Standard §15.247 (D)					

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.205(c)).





Test Equipment Used							
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due		
CSSA	ETS Lindgren	FACT3	87020484	10/2016	10/2018		
EMI Test Receiver	R&S	ESW44	87020967	06/2017	06/2018		
EMI Test Receiver	R&S	ESU40	87020455	04/2017	04/2018		
Antenna BiConiLog	ETS Lindgren	3124E-PA	87020457	04/2017	04/2020		



	Measured power (dBm)	Measured power at the band edge (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
ļ	17,01	-48,44	65,45	-2,99	45,45





Measured power (dBm)	Measured power at the band edge (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
17,04	-49,23	66,27	-2,96	46,27





Measured power (dBm)	Measured power at the band edge (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
17,01	-49,19	66,20	-2,99	46,20





Measured power (dBm)	Measured power at the band edge (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBm)	Margin (dB)
17,04	-50,46	67,50	-2,96	47,50



		Operat	tion Wode: #1		
		Antenna Po	plarization: Vertical		
		Lov	v Channel		
Receiver					
RBV	W (CISPR) 120 kHz	MT 100 ms	Emir	ad 30-1000MHz pol V	
Level	dBµV/m		Frequency	890.0000	000 MHz
Max Peak	33.95 🖬	.0 10	30	50	70 90
Scan O1Pk Max	·				
110 dBµV/m			M2[1] 0.000 s M1[1]		41.95 dBμV/m 02.000000 MHz 111.11 dBμV/m
100 dBµV/m			0.000 \$		902.750000 MHz
90 dBµV/m					
80 dBµV/m					
70 dBµV/m					
60 dBµV/m					
50 dBµV/m					
40 dBµV/m	manne	minter			harris
30 dBµV/m					
TF				F1	

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
111,11	41,95	69,16	91,11	49,16



		C	Operation I	Mode: #1			
		Antenn	a Polariza	tion: Horizontal			
			Low Ch	annel			
Receiver							E
Input 1 AC Att	<b>W</b> (CISPR) 120 kHz 0 dE	MT 1 Preamp	00 ms OFF <b>Ste</b>	Emi r p TD Scan	ad 30-1000MHz p	ol H	
Level	dBµV/m		Fre	equency	890.00	00000	MHz
Max Peak	34.94	10	10	30	50	70	90
Scan O1Pk Max	(						
110 dBµV/m				M2[1] 0.000 s M1[1] 0.000 c		39.93 902.00 106.70	2 dBµV/n 0000 MH 0 dBµV/n
100 dBµV/m				0.000 \$		902.73	
90 dBµV/m							_
80 dBµV/m							
70 dBµV/m							
60 dBµV/m							
50 dBµV/m						+	
40 dBµV/m		······	Sector and	and the second sec	M	2/ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	min
30 dBµV/m					10		
TF					F	1	

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
106,70	39,92	66,78	86,70	46,78



		Oper	ation Mode: #1		
		Antenna F	Polarization <sup>.</sup> Vertic	cal	
		HI	gh Channel		
Receiver					
RBW	(CISPR) 120 kHz	MT 100 m	s <b>at T</b> D	Emi rad 30-1000MI	Hz pol V
Scan O1Pk Max	U QB	Preamp OF	- Step ID Scan		
M1			M2[	1] 10 s	42.89 dBµV/m 928.000000 MHz
110 dBµV/m			M1[ 0.00	1] )0 s	111.31 dBµV/m 927.250000 MHz
100 dBµV/m					
90 dBµV/m					
80 dBµV/m					
70 dBµV/m					
60 dBµV/m					
50 dBµV/m	W2				
40 dBµV/m		- hand marked	an war war		man and a second s
30 dBµV/m	F1				
					Stop 040 0 MUs

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
111,31	42,89	68,42	91,31	48,42



		Opera	tion Mode: #1		
		Antenna Pol	arization: Horizontal		
		Hig	h Channel		
Receiver					
Input 1 AC Att	(CISPR) 120 kHz O dB	MT 100 ms Preamp OFF	Emi ra <b>Step</b> TD Scan	ad 30-1000MHz po	H ار
Level	dBµV/m		Frequency	925.000	00000 MHz
Max Peak	37.65 🗖	0 10	30	50	70 90
Scan 😑 1Pk Max			1		
110 dBµV/m — <u>M1</u>			M2[1] 0.000 s M1[1]		40.44 dBµV/m 928.000000 MHz 106.94 dBµV/m
100 dBµV/m			0.000 \$		927.230000 MH2
90 dBµV/m					
80 dBµV/m					
70 dBµV/m					
60 dBµV/m					
50 dBµV/m	M2				
-40.dB⊭V/m	- mour		mintum	mon	month and the second
30 dBµV/m	F1				
					Stop 040 0 MHz

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
106,94	40,44	66,50	86,94	46,50



Operation Mode: #5 (hopping)							
		Ar	ntenna Polariza	ation: Vertical			
			Low Cha	annel			
Receiver					(III)		
	RBW (CISPR) 1	.20 kHz <b>MT</b>	100 ms	Emi rad 30-	-1000MHz pol V		
Input 1 AC	Att	0 dB <b>Pream</b>	np OFF Step	) TD Scan			
Scan ⊖1Pk	Max		1	M9[1]	- 54 10 dbr// /m		
110 dBµV/m—				0.000 s M1[1]	¥,10 dBpV/m 9d2/ророоо мнг 111.04 dBµV/m		
100 dBµV/m—				0.000 s	902.750000 MHz		
90 dBµV/m—					/ ¥ ¥ ¥ ¥		
80 dBµV/m—							
70 dBµV/m—							
60 dBµV/m—					Mź		
50 dBµV/m—							
40 dBµV/m—	millinini	ann ann ann an	man	Marrow M			
30 dBµV/m—							
20 dBµV/m							
91	MHz				Stop 005 0 MHz		

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
111,04	54,10	56,94	91,04	36,94



Graphica	al representation of 1	00 kHz Bandwi	idth of Frequency Ban	d Edges - Radiated		
Operation Mode: #5 (hopping)						
	Ant	enna Polarizat	tion: Horizontal			
		Low Cha	annel			
Receiver						
RBW (	CISPR) 120 kHz MT	100 ms	Emi rad 30-1	1000MHz pol H		
Scan O1Pk Max		np orrate	p ib scan			
110 dBµV/m			M2[1] 0.000 s M1[1]	50.80 dBµV/m 402.000000 MHz 107.32 dBµV/m		
100 dBµV/m			0.000 s	/902.750000\MHz		
90 dBµV/m						
80 dBµV/m						
70 dBµV/m						
60 dBµV/m				Me		
50 dBµV/m				m		
40 dBµV/m		mun	mar and the second			
30 dBµV/m						
20 dBµV/m TF						
Start 890.0 MHz				Stop 905.0 MHz		

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
107,32	50,80	56,52	87,32	36,52





Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
110,60	56,61	53,99	90,60	33,99



	Operation N	Node: #5 (hopping)	
	Antenna Pol	arization: Horizontal	
	Hig	h Channel	
Receiver			▼
RBW (CISPR) 120 kHz	MT 100 ms	Emi rad 30-	1000MHz pol H
Scan O1Pk MaxO2Pk Clrw	Preamp OFF	step ib scan	
110 dBµV/m 100 dEµV/m 90 dBµV/m		M2[1] 0.000 s M1[1] 0.000 s	56.44 dBµV/m 928.090000 MHz 109.82 dBµV/m 927.250000 MHz
80 dBµV/m			
60 dBµV/m			
	mmm	mmmmm	
30 dBµV/m-	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mmmmmm	Museum market was a series of the series of
20 dBµV/m			
Start 925.0 MHz			Stop 040 0 MHz

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
109,82	56,44	53,38	89,82	33,38



			Operation	on Mode: #2		
		Ar	ntenna Pola	arization: Vertical		
			Low	Channel		
Receiver						
	RBW (CISPR)	120 kHz MT	100 ms	Emira	d 30-1000MHz pol V	
Scon 010k	Att	OdB <b>Pream</b>	np OFF	Step TD Scan		
ocan ⊎1PK				M2[1]		37.97 dBµV/m
				0.000 s		902.000000 MHz
110 dBµV/m—						104.16 dBµV/m Мола 750000 мнэ
				0.000 \$		
100 dBµV/m-						11
00 10 11/-						$\Lambda$ $ $
90 дВПЛ/ш—						
00 d0.47/e-						
ου αθηλλιψ—						
70 dBuV/m-						
, o aopv/m						
60 dBuV/m-						
oo uppyin						
50 dBuV/m	_					
					1	1
40 dBµV/m—					M2	1
man	monin	manhow	min	mannon	mont	minno
30 dBµV/m	_		_			
					F1	
TF					1	

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
104,16	37,97	66,19	84,16	46,19



			Opera	tion Mode:	#2		
		A	ntenna Pol	arization: I	Horizontal		
			Lov	w Channel			
Receiver							E
	RBW (CISPR)	) 120 kHz <b>MT</b>	100 ms		Emi rad 30-1	000MHz pol H	
Input 1 AC	Att	O dB Pre	amp OFF	Step TD 9	Scan		
Scan O1Pk	< Max						
					M2[1] 0.000 s	902	).01 авру/п .000000 MH:
110 dBµV/m-					-M1[1]	M105	i.61 dBµV/n
					0.000 s	<b>9</b> 02.	.750000 MH
100 dBµV/m-							
90 dBµV/m—							
80 dBµV/m—							
70 dBµV/m—							
60 dBµV/m—							
50 dBµV/m—							
40 dBuV/m—						M2/	1
man	minun	m	mon	man	manna	m	mount
30 dBµV/m—							
						F1	
TF							

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
105,61	39,01	66,60	85,61	46,60



Operation Mode: #2											
		Antenna P	olarization: Ve	rtical							
	High Channel										
Receiver	Receiver										
RBV	V (CISPR) 120 kHz 0 dB	MT 100 ms Preamp OFF	: Step TD Scan	Emi rad 30-10	000MHz pol V	\					
Scan 👴 1 Pk Max		-	•								
110 dBµV/mM	1		M 0. M 0.	2[1] .000 s 1[1] .000 s	92 1 92	40.42 dBµV/m 8.000000 MHz 07.68 dBµV/m ?7.250000 MHz					
100 dBµV/m											
90 dBµV/m											
80 dBµV/m											
70 dBµV/m											
60 dBµV/m											
50 dBµV/m											
40 dBbV/m	human		mann	hannana	un Mun man						
30 dBµV/m	F1										
Start 925.0 MHz	U		1	I	l	on 040 0 MHz					

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
107,68	40,42	67,26	87,68	47,26



Operation Mode: #2									
			Anten	na Pola	arization: Horiz	zontal			
				Hig	h Channel				
Receiver									
	RBW (CIS	PR) 120 kHz	MT	100 ms		Emi rad 30-10	100MHz pol H		
Input 1 AC	Att	0 dB	Preamp	OFF	Step TD Scan				
Scan OIPK	Max				54	9[1]		41.79 dBuV/m	
					0.	000 s	92	8.000000 MHz	
110 dBµV/m—					M	1[1]	1	08.90 dBµV/m	
	- A - L				0.	000 s	92	27.250000 MHz	
100 dBµV/m—									
	$-\Lambda$								
90 dBµV/m									
Í									
80 dBuV/m									
Í	1 1								
70 dBuV/m									
	111								
60 dBu\//m									
	$I \wedge I$								
50 dBu)//m	$\int \Lambda$								
40 db 0 db		No.							
•₩0°005µV/m—			aliments	~~~~~~	marente	man	mount	and the second s	
зо авµv/m—									
TF	F1								
Start 925.0	MHz					L	St	op 940.0 MHz	

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
108,90	41,73	67,17	88,90	47,17



Operation Mode: #6 (hopping)										
		Antenna	Polarizatio	n: Vertical						
Low Channel										
Receiver										
RBW (	CISPR) 120 kHz	MT 100	ms	Emi rad 30	-1000MHz pol V					
Input 1 AC Att	0 dB	Preamp 0	FF Step TO	) Scan						
110 dBµV/m				M2[1] 0.000 s M1[1]	49.70 dBµV/ №902.000000 MI					
100 dBµV/m				0.000 s	902.750000 MI					
90 dBµV/m										
80 dBµV/m										
70 dBµV/m										
					M2					
40 dBuV/m				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~					
30 dBµV/m		nhimm	min	June of the second seco						
20 dBµV/m										
Start 890 0 MHz										

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
104,69	49,70	54,99	84,69	34,99



Antenna Polarization: Horizontal         Low Channel         Receiver       Imput 1 AC       Att       0 dB       Preamp       0FF       Emi rad 30-1000MHz pol H       Imput 1 AC       Att       0 dB       Preamp       0FF       Step TD Scan       M152.82 dBµV/m       M162.100.000 s       M162.100.000 s </th <th colspan="9">Operation Mode: #6 (hopping)</th>	Operation Mode: #6 (hopping)								
Low Channel         Receiver         RBW (CISPR) 120 kHz       MT       100 ms       Emi rad 30-1000MHz pol H         Input 1 AC       Att       0 dB       Preamp       OFF       Step TD Scan         Scan       110 dBµV/m       0.000 s       M152.82 dBµV/m       M152.82 dBµV/m         100 dBµV/m       0.000 s       M111       0.000 s       90.2,750000 MHz         100 dBµV/m       0.000 s       90.000 s       90.2,750000 MHz       100/2,750000 MHz         90 dBµV/m       0.000 s       90.000 s       90.2,750000 MHz       90.000 s         90 dBµV/m       0.000 s       90.000 s       90.000 s       90.000 s         90 dBµV/m       0.000 s       90.000 s       90.000 s       90.000 s         90 dBµV/m       0.000 s       90.000 s       90.000 s       90.000 s         90 dBµV/m       0.000 s       90.000 s       90.000 s       90.000 s         90 dBµV/m       0.000 s       90.000 s       90.000 s       90.000 s         90 dBµV/m       0.000 s       90.000 s       90.000 s       90.000 s         90 dBµV/m       0.000 s       90.000 s </th <th></th> <th></th> <th>Anter</th> <th>nna Polarizatio</th> <th>on: Horizontal</th> <th></th>			Anter	nna Polarizatio	on: Horizontal				
Receiver       RBW (CISPR) 120 kHz       MT       100 ms       Emi rad 30-1000MHz pol H         Input 1 AC       Att       0 dB       Preamp       OFF       Step TD Scan         Scan       110 dBµV/m       0.000 s       M152.82 dBµV/m       M152.82 dBµV/m         100 dBµV/m       0.000 s       M111       109/27 dBµV/m         90 dBµV/m       0.000 s       992.750000 MHz         90 dBµV/m       0.000 s       992.750000 Mz         90 dBµV/m       0.000 s       992.750000 Mz <th></th> <th></th> <th></th> <th>Low Cha</th> <th>nnel</th> <th></th>				Low Cha	nnel				
Receiver       Image: Constraint of the state of	- ·					ſm			
Input 1 AC       Att       0 dB       Preamp       OFF       Step TD Scan         Scan       01Pk Max       0.000 s       M12[1]       M1 52.82 dBµV/m       602,000,00,MHz         110 dBµV/m       0.000 s       M1[1]       0.000 s       902,7500c0 MHz         100 dBµV/m       0.000 s       M1[1]       109,27 dBµV /m       902,7500c0 MHz         90 dBµV/m       0.000 s       0.000 s       0.000 s         80 dBµV/m       0.000 s       0.000 s       0.000 s         90 dBµV/m       0.000 s       0.000 s       0.000 s         90 dBµV/m       0.000 s       0.000 s       0.000 s         90 dBµV/m       0.000 s       0.000 s       0.000 s	Receiver			100					
Scan       Internet       Internet       Mile         110 dBµV/m       0.000 s       M1 52.82 dBµV/m       109,27 dBµV/m         100 dBµV/m       0.000 s       M1[1]       109,27 dBµV/m       902.750000 MHz         90 dBµV/m       0.000 s       902.750000 MHz       902.750000 MHz       109,27 dBµV/m         90 dBµV/m       0.000 s       902.750000 MHz       902.750000 MHz       109,27 dBµV/m         90 dBµV/m       0.000 s       902.750000 MHz       902.750000 MHz       109,27 dBµV/m         90 dBµV/m       902.750000 MHz       902.750000 MHz       109,27 dBµV/m       902.750000 MHz         90 dBµV/m       902.750000 MHz       902.750000 MHz       902.750000 MHz       902.750000 MHz         90 dBµV/m       900 dBµV/m <td>Input 1 AC</td> <td>Att</td> <td>экна мн OdB <b>Preamn</b></td> <td>OFF Sten</td> <td>TD Scan</td> <td>тооомна рогн</td>	Input 1 AC	Att	экна мн OdB <b>Preamn</b>	OFF Sten	TD Scan	тооомна рогн			
M2[1]       M152.82 dBµV/m         110 dBµV/m       0.000 s         100 dBµV/m       0.000 s         90 dBµV/m       0.000 s         90 dBµV/m       90 dBµV/m	Scan O1Pk M	Лах							
90 dBµV/m 90 dBµV/m 80 dBµV/m 70 dBµV/m 60 dBµV/m 50 dBµV/m 40 dBµV/m 30 dBµV/m 10 dBµV/m	110 dBµV/m-				M2[1] 0.000 s M1[1] 0.000 s	M1 52.82 dBµV/m 902,000000 MHz 109,27 dBµV/m 902,750000 MHz			
80 dBµV/m 70 dBµV/m 60 dBµV/m 50 dBµV/m 40 dBµV/m 30 dBµV/m 20 dBµV/m FF	90 dBµV/m								
70 dBµV/m	80 dBµV/m								
60 dBµV/m 50 dBµV/m 40 dBµV/m 30 dBµV/m FI 10 dBµV/m 10 dBµV	70 dBµV/m					/			
50 dBµV/m 40 dBµV/m 30 dBµV/m FI FI FI FI FI FI FI FI FI FI	60 dBµV/m					M2			
40 dBµV/m 30 dBµV/m 20 dBµV/m F1 F1	50 dBµV/m				- markin	~~~~			
30 dBµV/m 20 dBµV/m TF	40 dBµV/m	manna	iinnin	mmm					
20 dBµV/m F1	30 dBµV/m								
	20 dBµV/m TF								

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
109,27	52,82	56,45	89,27	36,45



Operation Mode: #6 (hopping)									
		Antenna P	olarization: Vertical						
		Hi	gh Channel						
Receiver									
RBW Input 1 AC Att	(CISPR) 120 kHz 0 dB	MT 100 ms Preamp OFF	5 Emi rad 30-10 5 Step TD Scan	DOOMHz pol V					
Scan 😑 1Pk Max		-	•						
			M2[1] 0.000 s M1[1] 0.000 s	52.09 dBµV/m 928.090000 MHz 104.28 dBµV/m 927.250000 MHz					
90) авµV/m									
80 dBµV/m									
70 dBµV/m									
60 dBµV/m	M2								
50 dBµÝ/m	M	na a							
40 dBµV/m		- North Marando	and we have a second	-harmon - harmon - har - ha					
30 dBµV/m									
20 dBµV/m	F1	1							

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
104,28	52,09	52,19	84,28	32,19



	Op	peration M	lode: #6 (hop	ping)			
	Anto	enna Pola	arization: Horiz	zontal			
		High	n Channel				
Receiver	Receiver						
RBW (CISPF	१) 120 kHz MT 0 dB Pream	100 ms ווס OFF	Step TD Scan	Emi rad 30-1	LOOOMHz pol H		
Scan O1Pk Max		-					
1/10 dBµV/m			M 0. M 0.	2[1] 000 s 1[1] 000 s	9: 1 9:	56.78 dBµV/m 28.090000 MHz 11.07 dBµV/m 27.250000 MHz	
80 dBµV/m							
60 dBµV/m	0						
50 dBµV/m	Manna						
40 dBµV/m		mm	mm		-	·····	
30 dBµV/m							
20 dBµV/m				C			
Start 925.0 MHz	1			1	SI	op 940.0 MHz	

Measured power (dBuV/m)	Measured power at the band edge (dBuV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –20 dB (dBuV/m)	Margin (dB)
111,07	56,78	54,29	91,07	34,29



11.8 TEST: Number of Hopping frequencies					
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C			
test	Relative Humidity (%)	30 to 60 %			
Parameters recorded during the	Laboratory Ambient Temperature (°C)	22°C			
test	Relative Humidity (%)	36%			
	Air pressure (hPa)	1033			
—	Power Supply & Frequency	Application Point			
Fully configured sample tested at the power line frequency	+5V dc	RF connector			
Equipment mode:	Operation mode	#4			
FCC Standard	§15.247 (A) (	1) (III)			
For FHSs in the band 902-928 MHz the system shall use at least 50 hop not be greater than 0.4 seconds wit is 250 kHz or greater, the system s occupancy on any channel shall no 20 dB bandwidth of the hopping cha	MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, hopping channels and the average time of occupancy on any channel shall within a 20-second period. If the 20 dB bandwidth of the hopping channel m shall use at least 25 hopping channels and the average time of l not be greater than 0.4 seconds within a 10-second period. The maximum a channel shall be 500 kHz				
Further information to test setup					
	EUT Attenuator (optional)	Spectrum Analyzer (or Power Meter)			



Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESR3	87020864	11/2016	11/2017





11.9 TEST: Carrier frequency separation					
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C			
test	Relative Humidity (%)       30 to				
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	23°C			
	Relative Humidity (%)	36%			
	Air pressure (hPa) 1033				
	Power Supply & Frequency	Application Po	pint		
Fully configured sample tested at the power line frequency	+5V dc	RF connecto	or		
Equipment mode:	Operation mode	#4			
FCC Standard	§15.247 (A) (1)				
FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-					

2483.5 MHz may have hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo

The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Further information to test setup				
	EUT	Attenuator (optional)	Spectrum Analyzer (or Power Meter)	



Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESR3	87020864	11/2016	11/2017



Channel	Channel Carrier frequency		Plot	
(No.)	(No.) separation		(No.)	
1 (Low)	1 (Low) 500,80 kHz		1	





Channel (No.)	Carrier frequency separation	Limit (Minimum 25kHz or 20dB bandwidth)	Plot (No.)	
25 (Middle)	500,80 kHz	76,28 kHz	2	





Channel (No.)	Carrier frequency separation	Limit (Minimum 25kHz or 20dB bandwidth)	Plot (No.)
50 (High)	504,80 kHz	75,00 kHz	3



11.10 TEST: Average time of occupancy					
Laboratory Ambient Temperature (°C	) 15 to 35 °C				
Relative Humidity (%)	30 to 60 %				
Laboratory Ambient Temperature (°C	) 23°C				
Relative Humidity (%)	36%				
Air pressure (hPa)	1033				
Power Supply & Frequency	Application Point				
+5V dc	RF connector				
Operation mode	#4				
§15.247 (A)	(1) (III)				
FHSs in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, system shall use at least 50 hopping channels and the average time of occupancy on any channel sha be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel 50 kHz or greater, the system shall use at least 25 hopping channels and the average time of upancy on any channel shall not be greater than 0.4 second period. The maximur dB bandwidth of the hopping channel shall be 500 kHz.					
EUT Attenuator	Spectrum Analyzer (or Power Meter)				
	Laboratory Ambient Temperature (°C Relative Humidity (%) Laboratory Ambient Temperature (°C Relative Humidity (%) Air pressure (hPa) Power Supply & Frequency +5V dc Operation mode §15.247 (A) : if the 20 dB bandwidth of the hopping ping channels and the average time of hin a 20-second period. If the 20 dB ba all use at least 25 hopping channels a be greater than 0.4 seconds within a 2 nnel shall be 500 kHz.				

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU8	87020455	04/2017	04/2018



Results						
Operation Mode: #4						
Channel (No.)	Single packet duration (ms)	Time between next hop (s)	Average time of occupancy (ms) in a period of 20s*	Limit of Average time of occupancy (ms) in a period of 20s	Plot (No.)	
1 (Low)	20,512	1,134	361,76	400	1÷3	
*= (20 sec. / time between next hon) / single packet duration						





Results						
Operation Mode: #4						
Channel (No.)Single packet duration (ms)Time between next hop (s)Average time of occupancy (ms)Limit of Average time of occupancy (ms)Plot (No(ms)(s)in a period of 20s*occupancy (ms) in a period of 20s20sPlot (No						
25 (Middle)	20,448	1,128	362,55	400	4÷6	
*= (20 sec. / time between next hop) / single packet duration						





Results						
Operation Mode: #4						
Channel (No.)	Single packet duration (ms)	Time between next hop (s)	Average time of occupancy (ms) in a period of 20s*	Limit of Average time of occupancy (ms) in a period of 20s	Plot (No.)	
50 (High)	20,416	1,127	362,30	400	7÷9	
*= (20 sec. / time between next hop) / single packet duration						





11.11 TEST: RF Exposure Requirements PA					
Parameters required prior to the	Laboratory Ambient Temperature (°C)	15 to 35 °C	;		
test	Relative Humidity (%)	30 to 60 %			
Parameters recorded during the	Laboratory Ambient Temperature (°C)				
test	Relative Humidity (%)				
	Air pressure (hPa)	1020			
_	Power Supply & Frequency	Application Po	oint		
Fully configured sample tested at the power line frequency	t +5V dc				
Equipment mode:	Operation mode #1				
FCC Standard	§ 1.1310 (1) (B)				
Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines § 1.1310, table (1) (b)					
EUT classification (fixed, mobile or portable devices)	Fixed equipment used in Uncontrolled Exposure environment				
Limits Freq. Range 300÷1500MHz	f/1500 (Power Density (mW/cm <sup>2</sup> ))				
Power Density (mW/cm <sup>2</sup> )	$S = P * G / 4\pi r^2$				

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P = Conducted Power (mW); G = Numeric Gain  $(10^{(dBi/10)})$ ; r = distance (cm)



СН	Frequency (MHz)	Max Radiated Output Power (P) (dBm)	Max Radiated Output Power (P) (mW)	Distance (r) (cm)	Power Density (S) (mW/cm²)	Limits (f/1500)
Low	902,75	10,49	11,20	20	0,0022	0,602
Middle	915,25	10,75	11,89	20	0,0023	0,610
High	927,25	10,50	11,22	20	0,0022	0,618
VERDICT						
The EUT Radiated Power density at evaluation distance is WHITIN THE LIMIT at the distance of 20cm. The EUT Radiated Power density is OUT OF THE LIMIT if the distance is < 1,24cm						

# **END OF TEST REPORT**