

TEST REPORT

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Manufacturer or Supplier	SHENZHEN HUBSAN TECHNOLOGY CO., LTD	
Address	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054	
Product	Hubsan Zino	
Brand Name	Hubsan	
Model	Zino	
Additional Model & Model Difference	N/A	
Date of tests	Dec. 19, 2018 ~ Jan. 07, 2019	

The submitted sample of the above equipment has been tested according to the requirements of the following standard:

EN 300 440 V2.2.1 (2018-07)

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

<p>Tested by Andy Zhu Project Engineer / EMC Department</p>	<p>Approved by Glyn He Supervisor/ EMC Department</p>
	
<p>Date: Jan. 22, 2019</p>	

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RE181219N054-2	Original release	Jan. 22, 2019



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: EN 300 440 V2.2.1 (2018-07)			
Standard Subclause	Test Type and Limit	Result	Remark
	TRANSMITTER PARAMETERS		
4.2.2	Equivalent Isotropic Radiated Power	PASS	Applicable
4.2.3	Permitted range of operating frequency	PASS	Applicable
4.2.4	Unwanted emissions in the spurious domain	PASS	Applicable
4.2.5	Duty Cycle	N/A	Not Applicable
	RECEIVER PARAMETERS		
4.3.3	Adjacent channel selectivity	N/A	Not Applicable
4.3.4	Blocking or desensitization	PASS	Applicable
4.3.5	Radiated spurious emission	PASS	Applicable



Receiver categories

Receiver category	Relevant receiver clauses	Risk assessment of receiver performance	The EUT Category
1	4.3.3, 4.3.4 and 4.3.5	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).	-
2	4.3.4 and 4.3.5	Medium reliable SRD communication media e.g. causing inconvenience to persons, which cannot simply be overcome by other means.	-
3	4.3.4 and 4.3.5	Standard reliable SRD communication media e.g. Inconvenience to persons, which can simply be overcome by other means (e.g. manual).	√

If receiver category 1 or 2 is selected, this shall be stated in both the test report and in the user's manual for the equipment.

**1.1 TEST INSTRUMENTS**

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Loop antenna	SCHWARZBECK	FMZB 1516	CQA-060	2018/10/28	2019/10/27
Horn Antenna	R&S	HF906	CQA-012	2018/9/26	2019/9/25
Bilog Antenna	R&S	HL562	CQA-011	2018/9/26	2019/9/25
EMI Test Receiver	R&S	ESR7	CQA-005	2018/10/28	2019/10/27
Spectrum analyzer	R&S	FSU26	CQA-038	2018/10/28	2018/10/27
Preamplifier	MITEQ	AFS4-0001030 0-18-10P-4	CQA-035	2018/9/26	2019/9/25
Preamplifier	MITEQ	AMF-6D-02001 800-29-20P	CQA-036	2018/11/2	2019/11/1
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	CQA-022	2018/9/26	2019/9/25
high-low temperature chamber	Auchno	OJN-9606	CQA-CB2	2018/9/26	2019/9/25
Signal generator	ANRITSU	MG3692B	CQA-019	2018/9/26	2019/9/25
Signal generator	R&S	SME06	CQA-024	2018/9/26	2019/9/25
Vector signal generator	R&S	SMBV100A	CQA-039	2018/9/26	2019/9/25
DC power	KEYSIGHT	E3631A	CQA-028	2018/9/26	2019/9/25
RF Control Unit	Tonsced	JS0806-2	CQA-057	2018/9/26	2019/9/25
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2018/9/26	2019/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2018/9/26	2019/9/25
RF Cable (9KHz~40GHz)	CQA	N/A	C005	2018/9/26	2019/9/25
Power Sensor	KEYSIGHT	U2021XA	CQA-30	2018/9/26	2019/9/25
N1918A Power Analysis Manager Power Panel	Agilent	N1918A	CQA-074	2018/9/26	2019/9/25
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2018/9/26	2019/9/25

NOTE:

1. The test was performed in Shenzhen Huaxia Testing Technology Co., Ltd
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.



1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

Parameter	Uncertainty
Radio frequency	$\pm 3 \times 10^{-8}$
RF power (conducted)	± 0.86 dB
Radiated emission of transmitter, valid up to 26.5GHz	± 4.60 dB
Radiated emission of transmitter, valid between 26.5GHz and 66GHz	± 4.96 dB
Radiated emission of receiver, valid up to 26.5GHz	± 4.60 dB
Radiated emission of receiver, valid between 26.5GHz and 66GHz	± 4.96 dB
Temperature	± 0.8 °C
Humidity	± 2.0 %
Voltages(DC)	± 0.5 %
Voltages(AC, <10kHz)	± 0.5 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.3 MAXIMUM MEASUREMENT UNCERTAINTY

For the test methods, according to ETSI EN 300 440 standard, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 [7] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Parameter	Uncertainty
Radio frequency	$\pm 1 \times 10^{-7}$
RF power (conducted)	± 1.5 dB
Radiated emission of transmitter, valid up to 26.5GHz	± 6.0 dB
Radiated emission of transmitter, valid between 26.5GHz and 66GHz	± 8.0 dB
Radiated emission of receiver, valid up to 26.5GHz	± 6.0 dB
Radiated emission of receiver, valid between 26.5GHz and 66GHz	± 8.0 dB
Temperature	± 1 °C
Humidity	± 5.0 %
Voltages(DC)	± 1.0 %
Voltages(AC, <10kHz)	± 2.0 %



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Hubsan Zino		
MODEL NO.	Zino		
ADDITIONAL MODEL	N/A		
NOMINAL VOLTAGE	DC 11.4V from battery(Charging from adapter)		
OPERATING VOLTAGE RANGE	Vnom=11.4V	Vmin= 8.4V	Vmax=13.1V
OPERATING TEMPERATURE RANGE	-10 ~ +55°C		
MODULATION TECHNOLOGY	OFDM		
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK for OFDM		
OPERATING FREQUENCY	5745MHz ~ 5825MHz		
EIRP POWER	13.21dBm (Measured Max.)		
ANTENNA TYPE	ANT1: FPC Antenna, 2.95dBi Gain ANT2: FPC Antenna, 2.95dBi Gain		
CABLE SUPPLIED	Refer to user's manual		
RECEIVER CATEGORY	<input type="checkbox"/> Category 1	<input type="checkbox"/> Category 2	<input checked="" type="checkbox"/> Category 3

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
- Please refer to the EUT photo document (Reference No.: 181219N054-2) for detailed product photo.
- The battery was charging from the following adapter:

Adapter	
BRAND:	N/A
MODEL:	P150W1000U
INPUT:	AC 100-240V, 50/60Hz 0.25A
OUTPUT:	DC 15V, 1000mA
DC LINE:	Unshielded, Non-detachable, 1.2m



5. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.

MODULATION MODE	FUNCTION
802.11a	2TX/2RX
802.11n (HT20) 802.1ac (VHT20)	2TX/2RX
802.11n (HT40) 802.1ac (VHT40)	2TX/2RX

Only support SISO mode



2.2 DESCRIPTION OF TEST MODES

WLAN 5.745 ~ 5.825GHz

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac(VHT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40), 802.11ac(VHT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product, according to the specifications of the manufacturers; it must comply with the requirements of the following standards:

EN 300 440 V2.2.1 (2018-07)

All test items have been performed and recorded as per the above standards.

2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A



3 TEST TYPES AND RESULTS

TRANSMITTER PARAMETERS

3.1 EQUIVALENT ISOTROPIC RADIATED POWER

3.1.1 LIMITS OF EQUIVALENT ISOTROPIC RADIATED POWER

Condition	Limit (e.i.r.p)
Generic use(5725MHz to 5875MHz)	25 mW e.i.r.p.(14dBm)

For Extreme temperature ranges:

Category	Temperature range	The EUT Category
I (General)	-20°C to +55°C	-
II (Portable)	-10°C to +55°C	√
III (Equipment for normal indoor use)	5°C to +35°C	-
Declared by client	0°C to +40°C	-

3.1.2 TEST PROCEDURES

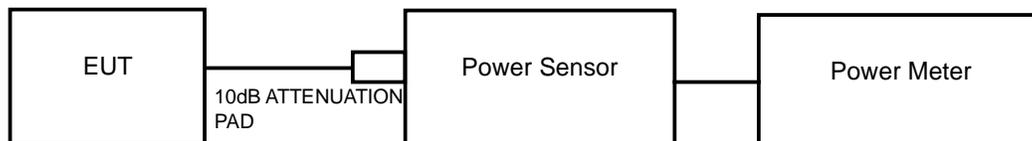
Refer to chapter 4.2.2.3 of EN 300 440 V2.2.1 (2018-07).

3.1.3 DEVIATION FROM TEST STANDARD

No deviation.

3.1.4 TEST SETUP

1. Ran a test program to control EUT transmit at specific channel
2. A power meter was used to read the response of the power sensor.
3. Record the power level.
4. EIRP = antenna gain + power level of step 3.





3.1.5 TEST RESULTS

ANT1

Maximum RF output power (e.i.r.p.) (dBm)								
Test	Condition	TN	TL	TH	TL	TH	Limit (dBm)	Pass/Fail
Channel		VN	VL		VH			
IEEE 802.11a								
Channel 149		12.98	12.99	12.85	13.06	12.83	14	Pass
Channel 157		13.12	13.13	13.01	13.21	13.02	14	Pass
Channel 165		13.06	13.12	12.92	13.16	12.96	14	Pass
IEEE 802.11n-HT20								
Channel 149		12.54	12.65	12.36	12.69	12.35	14	Pass
Channel 157		12.63	12.73	12.49	12.76	12.58	14	Pass
Channel 165		12.71	12.83	12.53	12.88	12.56	14	Pass
IEEE 802.11n-HT40								
Channel 151		12.34	12.49	12.32	12.51	12.45	14	Pass
Channel 159		12.45	12.58	12.41	12.63	12.44	14	Pass

ANT2

Maximum RF output power (e.i.r.p.) (dBm)								
Test	Condition	TN	TL	TH	TL	TH	Limit (dBm)	Pass/Fail
Channel		VN	VL		VH			
IEEE 802.11a								
Channel 149		12.77	12.79	12.63	12.83	12.59	14	Pass
Channel 157		12.89	12.89	12.8	12.97	12.81	14	Pass
Channel 165		12.79	12.86	12.67	12.93	12.74	14	Pass
IEEE 802.11n-HT20								
Channel 149		12.31	12.44	12.13	12.45	12.13	14	Pass
Channel 157		12.41	12.49	12.25	12.54	12.36	14	Pass
Channel 165		12.48	12.56	12.32	12.64	12.33	14	Pass
IEEE 802.11n-HT40								
Channel 151		12.11	12.28	12.09	12.26	12.21	14	Pass
Channel 159		12.23	12.34	12.17	12.41	12.22	14	Pass



3.2 PERMITTED RANGE OF OPERATING FREQUENCIES

3.2.1 LIMITS OF PERMITTED RANGE OF OPERATING FREQUENCIES

The width of the power envelope is $f_H - f_L$ for a give operating frequency. In equipment that allow adjustment or selection of different frequencies, the power envelope take up different positions in the allowed band. The frequency range is determined by the lowest value of f_L and the highest value of f_H resulting from the adjustment of the equipment to the lowest and highest operating frequency.

CONDITION	LIMIT
Under all test conditions	$F_L > 5725.0\text{MHz}$ $F_H < 5875.0\text{MHz}$

3.2.2 TEST PROCEDURES

Refer to chapter 4.2.3.3 of EN 300 440 V2.2.1 (2018-07).

3.2.3 DEVIATION FROM TEST STANDARD

No deviation.

3.2.4 TEST SETUP

The EUT and probe antenna were placed into the temperature oven. The probe has to be connected with spectrum analyzer. The power source of the EUT has to be connected with the power supply for voltage change. The frequency has to be recorded for the right and left end above threshold of highest and lowest channel respectively.



3.2.5 TEST RESULTS

ANT1

Permitted Range of Operating Frequencies (MHz)								
Test	Condition	TN	TL	TH	TL	TH	Limit	Pass/Fail
Channel		VN	VL	VH				
IEEE 802.11a								
Channel 149 (FL)		5735.71	5735.71	5735.51	5735.77	5735.64	Within band 5725 MHz to 5875 MHz	Pass
Channel 165 (FH)		5833.85	5833.72	5833.78	5833.78	5833.85		Pass
IEEE 802.11n-HT20								
Channel 149 (FL)		5735.58	5735.26	5735.32	5735.13	5735.51	Within band 5725 MHz to 5875 MHz	Pass
Channel 165 (FH)		5834.29	5834.36	5834.49	5834.42	5834.23		Pass
IEEE 802.11n-HT40								
Channel 151 (FL)		5736.41	5736.41	5736.28	5736.54	5736.54	Within band 5725 MHz to 5875 MHz	Pass
Channel 159 (FH)		5813.46	5813.46	5813.46	5813.46	5813.46		Pass

ANT2

Permitted Range of Operating Frequencies (MHz)								
Test	Condition	TN	TL	TH	TL	TH	Limit	Pass/Fail
Channel		VN	VL	VH				
IEEE 802.11a								
Channel 149 (FL)		5735.64	5735.45	5735.51	5735.77	5735.51	Within band 5725 MHz to 5875 MHz	Pass
Channel 165 (FH)		5833.72	5833.59	5833.72	5833.72	5833.78		Pass
IEEE 802.11n-HT20								
Channel 149 (FL)		5735.64	5735.71	5735.58	5735.58	5735.38	Within band 5725 MHz to 5875 MHz	Pass
Channel 165 (FH)		5833.97	5834.17	5834.17	5834.03	5834.10		Pass
IEEE 802.11n-HT40								
Channel 151 (FL)		5736.41	5736.28	5736.28	5736.15	5736.28	Within band 5725 MHz to 5875 MHz	Pass
Channel 159 (FH)		5813.46	5813.46	5813.46	5813.59	5813.46		Pass



3.3 MEASUREMENT RADIATED SPURIOUS EMISSION

3.3.1 LIMITS OF MEASUREMENT RADIATED SPURIOUS EMISSION

Frequency Range	47MHz to 74MHz 87.5MHz to 108MHz 174MHz to 230MHz 470MHz to 862MHz	Other Frequencies Below 1GHz	>1GHz
Limit (Operating)	4nW (-54dBm)	250nW (-36dBm)	1 μ W (-30dBm)
Limit (Standby)	2nW (-57dBm)	2nW (-57dBm)	20nW (-47dBm)

3.3.2 TEST PROCEDURES

Refer to chapter 4.2.4.3 of EN 300 440 V2.2.1 (2018-07).

3.3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.3.4 TEST SETUP

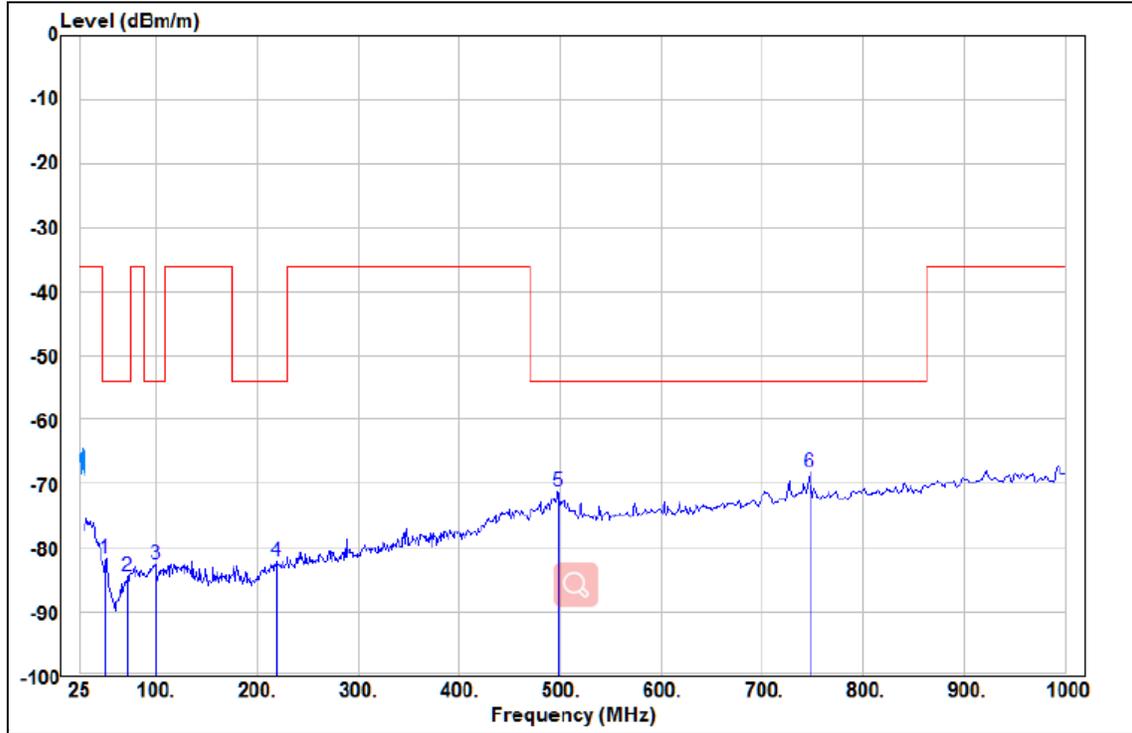
1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The test setup has been constructed as the normal use condition. Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.



3.3.5 TEST RESULTS

TX BELOW 1GHz WORST-CASE DATA: 802.11a

SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	149
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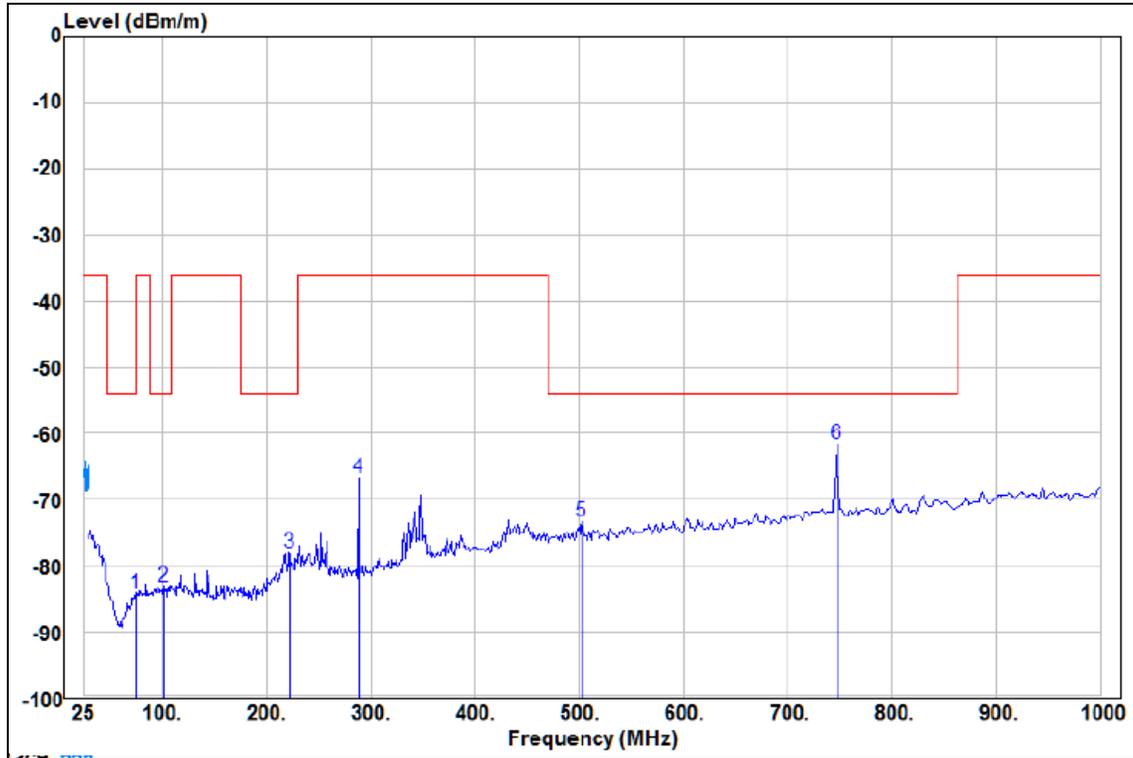
	Read Freq	Read Level	Read Factor	Limit Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	50.76	-90.06	8.46	-81.60	-54.00	-27.60	Peak	VERTICAL
2	71.58	-92.91	8.48	-84.43	-54.00	-30.43	Peak	VERTICAL
3	99.88	-92.91	10.34	-82.57	-54.00	-28.57	Peak	VERTICAL
4	219.08	-93.26	11.16	-82.10	-54.00	-28.10	Peak	VERTICAL
5	497.68	-89.05	17.83	-71.22	-54.00	-17.22	Peak	VERTICAL
6 pp	747.48	-89.61	21.42	-68.19	-54.00	-14.19	Peak	VERTICAL



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SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	149
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	Read Freq	Read Level	Read Factor	Limit Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	73.88	-93.26	9.13	-84.13	-54.00	-30.13	Peak	HORIZONTAL
2	101.64	-93.48	10.43	-83.05	-54.00	-29.05	Peak	HORIZONTAL
3	221.39	-89.24	11.21	-78.03	-54.00	-24.03	Peak	HORIZONTAL
4	287.99	-79.76	13.01	-66.75	-36.00	-30.75	Peak	HORIZONTAL
5	502.94	-91.17	17.88	-73.29	-54.00	-19.29	Peak	HORIZONTAL
6 pp	747.48	-82.99	21.42	-61.57	-54.00	-7.57	Peak	HORIZONTAL



ANT 1

ABOVE 1GHz DATA: 802.11a

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	149, 165
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
149	11490.00	H	-39.30	-30.00	-9.30
	11490.00	V	-38.90	-30.00	-8.90
	17235.00	H	-42.72	-30.00	-12.72
	17235.00	V	-40.41	-30.00	-10.41
165	11650.00	H	-39.94	-30.00	-9.94
	11650.00	V	-40.27	-30.00	-10.27
	17475.00	H	-40.17	-30.00	-10.17
	17475.00	V	-39.47	-30.00	-9.47

802.11n (20MHz)

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	149, 165
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
149	11490.00	H	-41.20	-30.00	-11.20
	11490.00	V	-39.59	-30.00	-9.59
	17235.00	H	-42.99	-30.00	-12.99
	17235.00	V	-42.72	-30.00	-12.72
165	11650.00	H	-39.77	-30.00	-9.77
	11650.00	V	-40.34	-30.00	-10.34
	17475.00	H	-40.27	-30.00	-10.27
	17475.00	V	-41.07	-30.00	-11.07



802.11n (40MHz)

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	151, 159
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
151	11510.00	H	-40.35	-30.00	-10.35
	11510.00	V	-39.58	-30.00	-9.58
	17265.00	H	-40.55	-30.00	-10.55
	17265.00	V	-42.55	-30.00	-12.55
159	11590.00	H	-40.43	-30.00	-10.43
	11590.00	V	-40.45	-30.00	-10.45
	17285.00	H	-41.69	-30.00	-11.69
	17385.00	V	-41.65	-30.00	-11.65



ANT 2

ABOVE 1GHz DATA: 802.11a

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	149, 165
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
149	11490.00	H	-39.63	-30.00	-9.63
	11490.00	V	-38.35	-30.00	-8.35
	17235.00	H	-41.72	-30.00	-11.72
	17235.00	V	-41.41	-30.00	-11.41
165	11650.00	H	-39.89	-30.00	-9.89
	11650.00	V	-39.89	-30.00	-9.89
	17475.00	H	-41.17	-30.00	-11.17
	17475.00	V	-40.17	-30.00	-10.17

802.11n (20MHz)

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	149, 165
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
149	11490.00	H	-40.60	-30.00	-10.60
	11490.00	V	-39.54	-30.00	-9.54
	17235.00	H	-41.99	-30.00	-11.99
	17235.00	V	-43.42	-30.00	-13.42
165	11650.00	H	-39.90	-30.00	-9.90
	11650.00	V	-40.89	-30.00	-10.89
	17475.00	H	-41.07	-30.00	-11.07
	17475.00	V	-40.07	-30.00	-10.07



802.11n (40MHz)

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	151, 159
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
151	11510.00	H	-40.64	-30.00	-10.64
	11510.00	V	-38.99	-30.00	-8.99
	17265.00	H	-41.65	-30.00	-11.65
	17265.00	V	-42.05	-30.00	-12.05
159	11590.00	H	-40.47	-30.00	-10.47
	11590.00	V	-39.55	-30.00	-9.55
	17285.00	H	-42.15	-30.00	-12.15
	17385.00	V	-42.65	-30.00	-12.65



3.4 DUTY CYCLE (NOT APPLY)

3.4.1 LIMITS OF DUTY CYCLE

Frequency Band	Duty Cycle	Application
2400MHz to 2483.5MHz	No Restriction	Generic use
2400MHz to 2483.5MHz	No Restriction	Detection, movement and alert applications
(a) 2446MHz to 2454MHz	No Restriction	RFID
(b) 2446MHz to 2454MHz	15%	RFID
5725MHz to 5875MHz	No Restriction	Generic use
9200MHz to 9500MHz	No Restriction	Detection, movement and alert applications
9500MHz to 9975MHz	No Restriction	Detection, movement and alert applications
10.5GHz to 10.6GHz	No Restriction	Detection, movement and alert applications
13.4GHz to 14.0GHz	No Restriction	Detection, movement and alert applications
17.1GHz to 17.3GHz	DDA or equivalent techniques	GBSAR detecting and movement and alert applications
24.00GHz to 24.25GHz	No Restriction	Detection, movement and alert applications

3.4.2 TEST PROCEDURES

Refer to chapter 4.2.5.3 of EN 300 440 V2.2.1 (2018-07).

3.4.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4.4 TEST SETUP

The test setup has been constructed as the normal use condition. Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.

3.4.5 TEST RESULTS

This product does not apply.



RECEIVER PARAMETERS

3.5 LIMITES OF ADJACENT CHANNEL SELECTIVITY

The adjacent channel selectivity of the equipment under specified conditions shall not be less than $-30 \text{ dBm} + k$

Receiver category	Limit
1	$-30\text{dBm} + K$

The correction factor, k , is as follows:

$$k = -20\log f - 10\log BW$$

Where:

f is the frequency in GHz;

BW is the channel bandwidth in MHz.

The factor k is limited within the following:

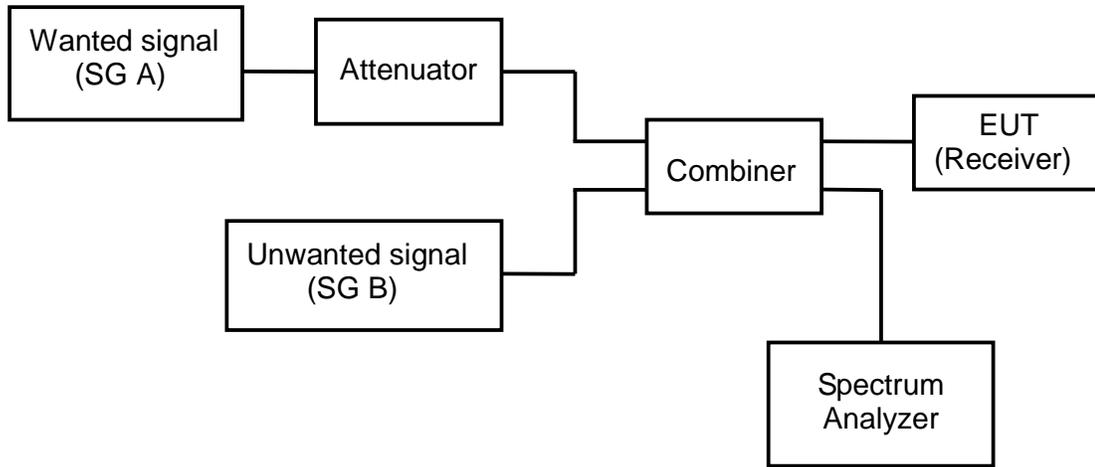
$$-40 \text{ dB} < k < 0 \text{ dB}$$

3.5.1 TEST PROCEDURES

Refer to chapter 4.3.3.3 of EN 300 440 V2.2.1 (2018-07).



3.5.2 TEST SETUP



3.5.3 TEST RESULTS

This product does not apply.



3.6 BLOCKING OR DESENSITIZATION

3.6.1 LIMITES OF RECEIVER BLOCKING

The blocking level, shall not be less than the values given in table

Receiver category	Limit
1	-30dBm + K
2	-45dBm + K
3	-60dBm + K

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:

f is the frequency in GHz;

BW is the channel bandwidth in MHz.

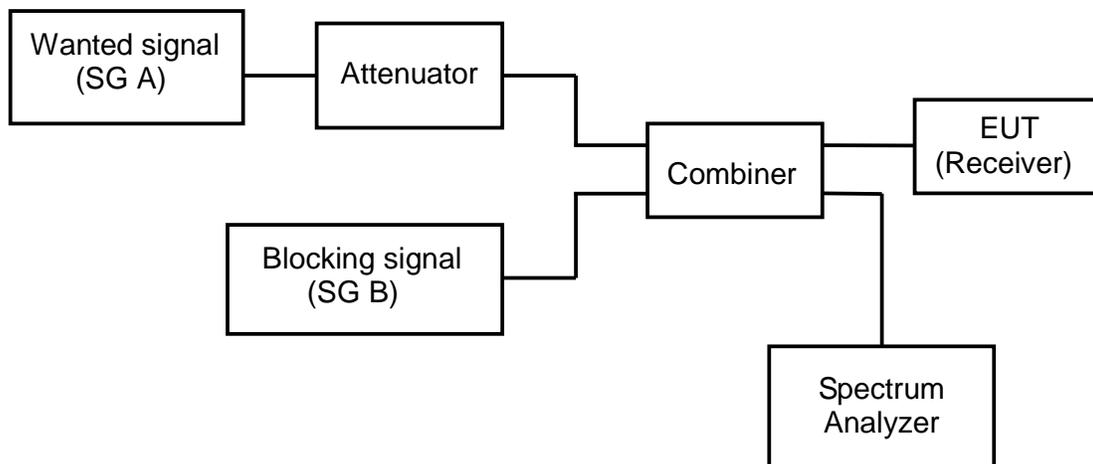
The factor k is limited within the following:

$$-40 \text{ dB} < k < 0 \text{ dB}$$

3.6.2 TEST PROCEDURES

Refer to chapter 4.3.4.3 of EN 300 440 V2.2.1 (2018-07).

3.6.3 TEST SETUP





3.6.4 TEST RESULTS

Receiver Category 3 Equipment

Blocking measure of the capability						
P _{min} : -89.41 dBm						
The actual blocking signal power(Note)					<input checked="" type="checkbox"/> at the antenna connector <input type="checkbox"/> in front of the antenna	
Note: For the conducted measurements, the same level should be used at the antenna connector irrespective of antenna gain.						
Operation mode	Operation frequency (MHz)	Wanted signal power (dBm)	Offset of the bandwidth (times)	Blocking signal frequency (MHz)	Blocking signal Power (dBm)	Minimum Limit
802.11a	5745	-86.41	-10	5375.96	-56.21	-87.34
			-20	5015.16	-52.03	
			-50	3932.76	-46.32	
	5825		+10	6193.24	-55.02	-87.48
			+20	6553.24	-51.74	
			+50	7633.24	-44.65	

Note:

- a) Lower Channel: $k = -20\log f - 10\log BW = -27.34$
- b) Upper Channel: $k = -20\log f - 10\log BW = -27.48$
- c) Limit = -60 dBm + k;



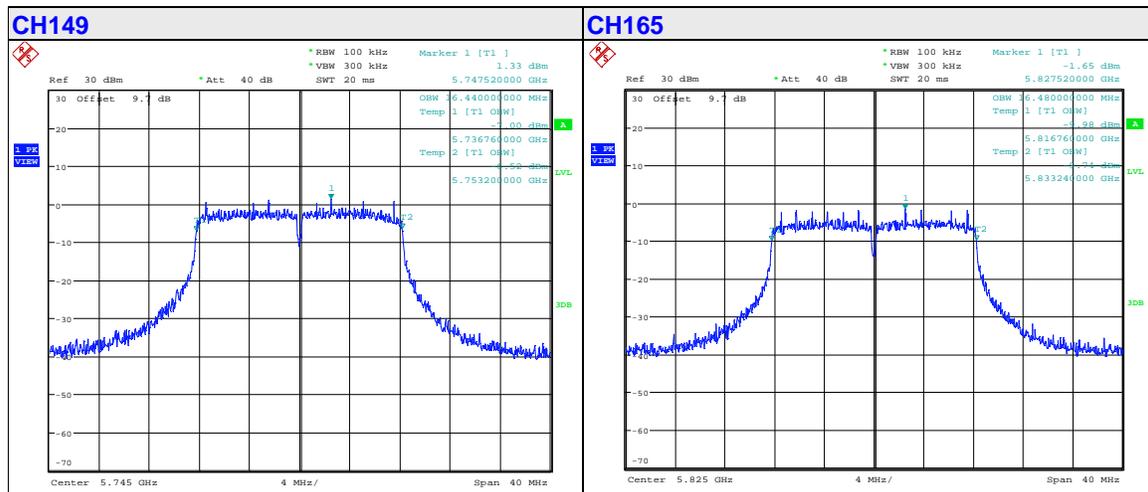
Blocking measure of the capability						
P _{min} : -82.27						
The actual blocking signal power(Note)					<input checked="" type="checkbox"/> at the antenna connector <input type="checkbox"/> in front of the antenna	
Note 1: For the conducted measurement, the same level should be used at the antenna connector irrespective of antenna gain.						
Operation mode	Operation Frequency (MHz)	Wanted signal power(dBm)	Offset of the bandwidth (times)	Blocking signal frequency (MHz)	Blocking Signal Power (dBm)	Minimum Limit
802.11n(40MHz)	5755	-79.27	-10	5376.04	-56.27	-90.78
			-20	5015.24	-51.65	
			-50	3932.84	-43.74	
	5795		10	6173.08	-55.49	-90.83
			20	6533.08	-51.60	
			50	7613.08	-42.46	
Note: a) Lower Channel: $k = -20\log f - 10\log BW = -30.78$ b) Upper Channel: $k = -20\log f - 10\log BW = -30.83$ c) Limit = -60 dBm + k;						



OCCUPIED BANDWIDTH (FOR REFERENCE)

For 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
CH149	5745	16.44
CH165	5825	16.48



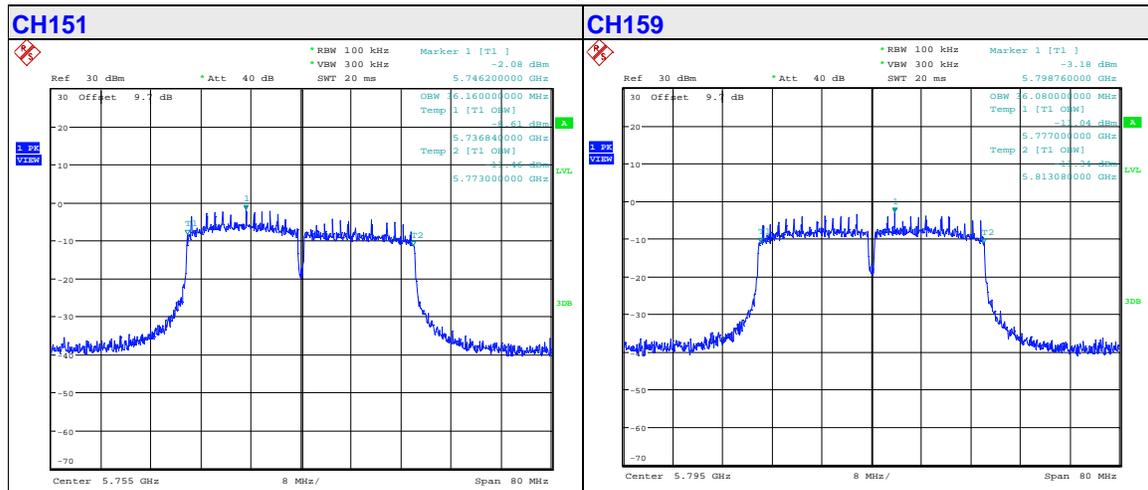


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For 802.11n(40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
CH151	5755	36.16
CH159	5795	36.08





3.7 RECEIVER SPURIOUS EMISSIONS

3.7.1 LIMITS OF RECEIVER SPURIOUS EMISSIONS

Frequency range	Frequencies below 1GHz	Frequencies above 1GHz
Limit	2nW or -57dBm	20nW or -47dBm

3.7.2 TEST PROCEDURES

Refer to chapter 4.3.5.3 of EN 300 440 V2.2.1 (2018-07).

3.7.3 DEVIATION FROM TEST STANDARD

No deviation.

3.7.4 TEST SETUP

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The test setup has been constructed as the normal use condition. Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.



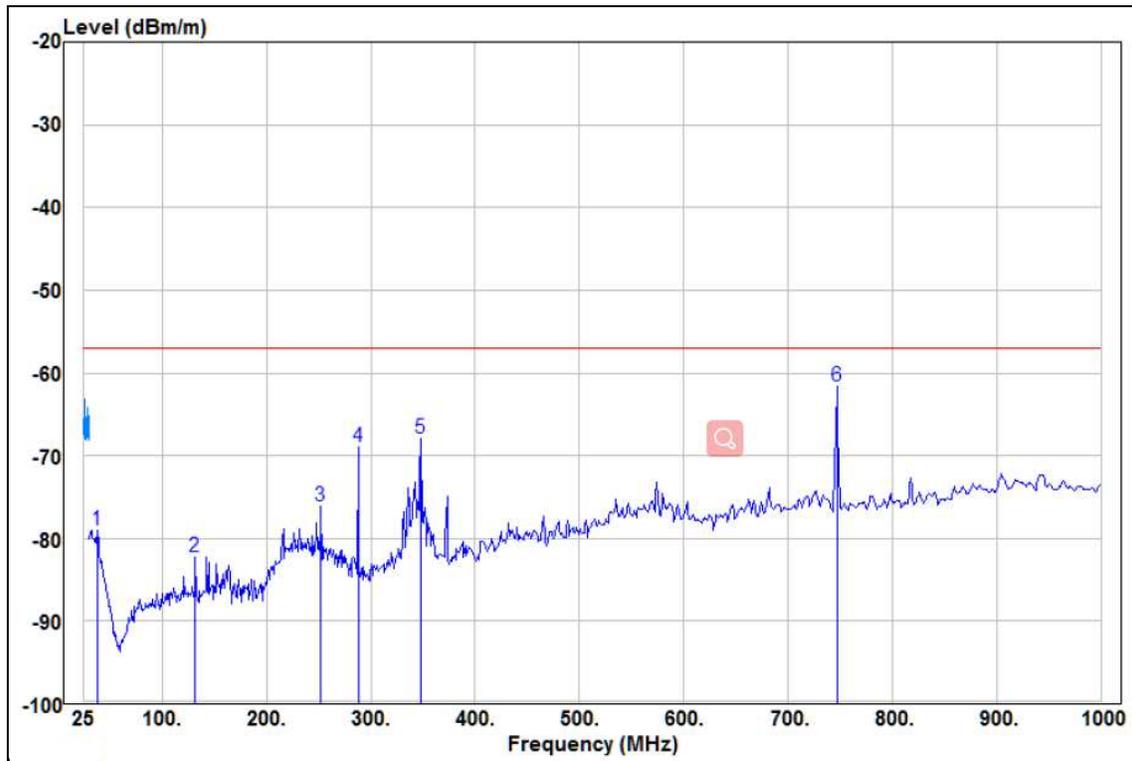
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3.7.5 TEST RESULTS

WORST-CASE DATA: ANT1_802.11n(40MHz)

SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	CH159
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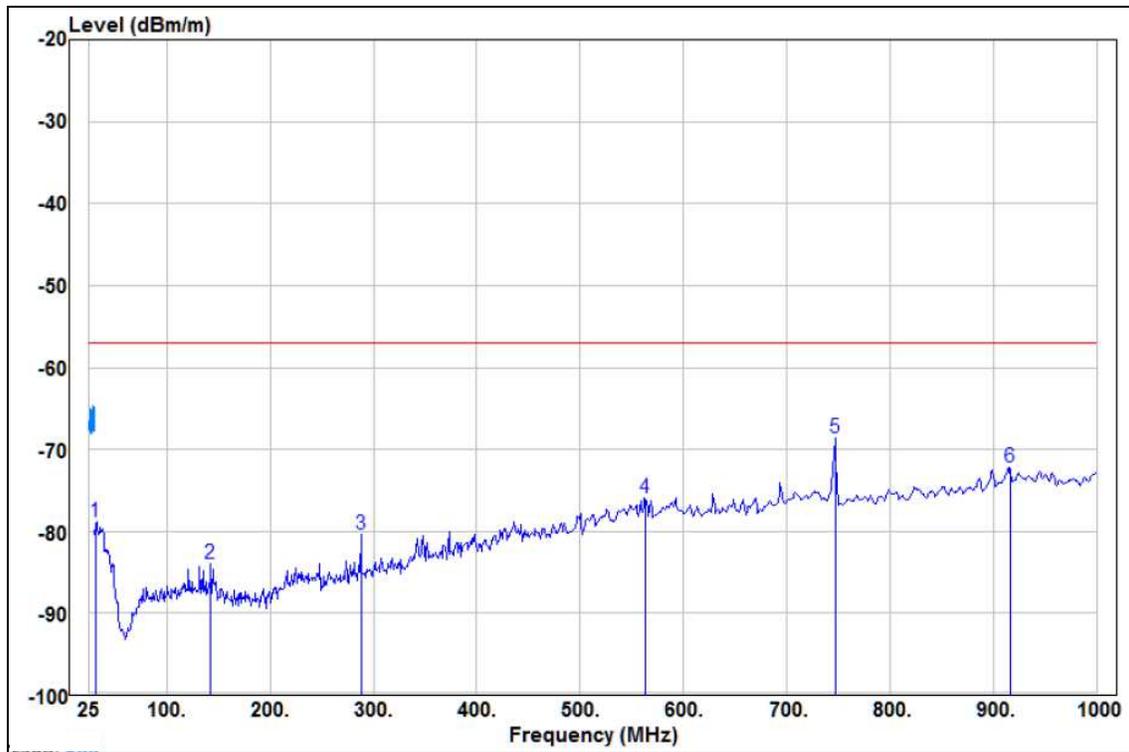
	Read Freq	Read Level	Factor	Limit Level	Over Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	37.42	-95.96	16.96	-79.00	-57.00	-22.00	Peak	HORIZONTAL
2	131.30	-92.76	10.57	-82.19	-57.00	-25.19	Peak	HORIZONTAL
3	252.06	-87.98	11.83	-76.15	-57.00	-19.15	Peak	HORIZONTAL
4	287.99	-81.95	13.01	-68.94	-57.00	-11.94	Peak	HORIZONTAL
5	348.03	-82.58	14.66	-67.92	-57.00	-10.92	Peak	HORIZONTAL
6 pp	747.48	-82.98	21.42	-61.56	-57.00	-4.56	Peak	HORIZONTAL



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SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	159
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	Read Freq	Level	Factor	Limit Level	Over Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	31.18	-96.56	17.69	-78.87	-57.00	-21.87	Peak	VERTICAL
2	141.83	-93.71	9.67	-84.04	-57.00	-27.04	Peak	VERTICAL
3	287.99	-93.42	13.01	-80.41	-57.00	-23.41	Peak	VERTICAL
4	562.66	-94.64	18.71	-75.93	-57.00	-18.93	Peak	VERTICAL
5 pp	747.48	-89.96	21.42	-68.54	-57.00	-11.54	Peak	VERTICAL
6	916.07	-95.87	23.62	-72.25	-57.00	-15.25	Peak	VERTICAL



ABOVE 1GHz DATA: ANT1_802.11a

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 40GHz	OPERATING CHANNEL	149, 165
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
149	11490.00	H	-55.60	-47.00	-8.60
	11490.00	V	-55.60	-47.00	-8.60
	17235.00	H	-55.52	-47.00	-8.52
	17235.00	V	-55.82	-47.00	-8.82
165	11650.00	H	-56.37	-47.00	-9.37
	11650.00	V	-55.67	-47.00	-8.67
	17475.00	H	-53.52	-47.00	-6.52
	17475.00	V	-53.19	-47.00	-6.19



4 PHOTOGRAPHS OF THE TEST CONFIGURATION

SPURIOUS EMISSION TEST BELOW 1GHz



SPURIOUS EMISSION TEST ABOVE 1GHz





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5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

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