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Report Template Version: V04
Report Template Revision Date: 2018-07-06

TEST REPORT

Report No. :	CQASZ20191101174E-04
Applicant:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD
Address of Applicant:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054
Equipment Under Test (EUT):	
EUT Name:	Hubsan ZINO PRO
Model No.:	ZINO PRO, Zino Pro
Test Model No.:	Zino Pro
Brand Name:	Hubsan
Standards:	ETSI EN 300 440 V2.1.1 (2017-03)
Date of Receipt:	2019-11-20
Date of Test:	2019-11-20 to 2019-11-29
Date of Issue:	2019-11-29
Test Result :	**PASS***

***In the configuration tested, the EUT complied with the standards specified above**

Tested By: _____
(Tom chen)

Reviewed By: _____
(Sheek Luo)

Approved By: _____
(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD. APPROVED

1 Version

Revision History of Report

Report No.	Version	Description	Issue Date
CQASZ20191101174E-04	Rev.01	Initial report	2019-11-29

2 Test Summary

Radio Spectrum Matter (RSM) Part			
Test item	**Test Requirement**	**Limit**	**Result**
Equivalent Isotropically Radiated Power	EN 300 440 V2.1.1 Clause 4.2.2	Clause 4.2.2.4	PASS
Permitted Range of Operating Frequencies	EN 300 440 V2.1.1 Clause 4.2.3	Clause 4.2.3.5	PASS
Spurious Emission from Tx	EN 300 440 V2.1.1 Clause 4.2.4	Clause 4.2.4.4	PASS
Duty Cycle	EN 300 440 V2.1.1 Clause 4.2.5	Clause 4.2.5.4	PASS
Additional requirements for FHSS equipment	EN 300 440 V2.1.1 Clause 4.2.6	Clause 4.2.6.4	N/A
Adjacent channel selectivity	EN 300 440 V2.1.1 Clause 4.3.3	Clause 4.3.3.4	N/A
Blocking or desensitization	EN 300 440 V2.1.1 Clause 4.3.4	Clause 4.3.4.4	PASS
Spurious Emission from Rx	EN 300 440 V2.1.1 Clause 4.3.5	Clause 4.3.5.4	PASS

Remark:
The tested sample(s) and the sample information are provided by the client.

Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radiated Frequency.
CH: In this whole report CH means channel.
Volt: In this whole report Volt means Voltage.
Temp: In this whole report Temp means Temperature.
Humid: In this whole report Humid means humidity.
Press: In this whole report Press means Pressure.
N/A: The EUT is spread spectrum equipment and it belongs to receiver category 3.

Model No.: ZINO PRO, Zino Pro
Only the model Zino Pro was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being model name.

3 Contents

4 General Information

4.1 Client information

Applicant:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD
Address of Applicant:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054
Manufacturer:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD
Address of Manufacturer:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054

4.2 General Description of EUT

Product Name:	Hubsan ZINO PRO	
Model No.:	ZINO PRO, Zino Pro	
Test Model No.:	Zino Pro	
Trade Mark:	Hubsan	
EUT Supports Radios application:	5.8G WIFI	
Power Supply:	remote-control unit	Battery: 3.6V 2600 mAh Li-Po
	plane unit	Battery: 11.4 V 3000 mAh Li-Po ADAPTER: Model: P150W1000E OUTPIT: DC15V BALANCA CHARGER: Model: BC007 INPUT: DC15V OUTPUT: DC11.4V

4.3 Product Specification subjective to this standard

Frequency Range:	5745MHz~5825MHz
Producte Category:	Non specific radio equipment (provider declaration)
Receiver category	Receiver category 3 (provider declaration)
Modulation Technique:	Spread spectrum
Modulation Type:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)
Transmitter Operating channel width(OCW)	20MHz (provider declaration)
Number of Channels:	5 (declared by the client)
Sample Type:	Portable production
Hardware version:	EA04058075-03
Software version:	V0.1.1
Test Software of EUT:	Atheros Radio test 2(manufacturer declare)
Antenna Type:	Integral antenna
Antenna Gain:	ANT1: 3.0dBi

	ANT2: 3.0dBi
Test voltage:	11.4 V

Operation Frequency Each of Channel							
Channel	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**
For IEEE 802.11a/n-HT20 operation in the 5725 MHz to 5825 MHz band							
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--	--	--

Using test software was control EUT work in continuous transmitter and receiver mode.and select test channel as below:

Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	**Middle(M)**	**Highest(H)**
IEEE 802.11a	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165
		5745 MHz	5785 MHz	5825 MHz

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

1）support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
/	/	/	/	/

2) Cable

Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by
/	/	/	/	/

4.5 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

4.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radiated Emission (Below 1GHz)	5.12dB
2	Radiated Emission (Above 1GHz)	4.60dB
3	Conducted Disturbance (0.15~30MHz)	3.34dB
4	Radio Frequency	3×10^{-8}
5	Duty cycle	0.6 %.
6	Occupied Bandwidth	1.1%
7	RF conducted power	0.86dB
8	RF power density	0.74
9	Conducted Spurious emissions	0.86dB
10	Temperature test	0.8℃
11	Humidity test	2.0%
12	Supply voltages	0.5 %.
13	Frequency Error	5.5 Hz

5 Equipment List

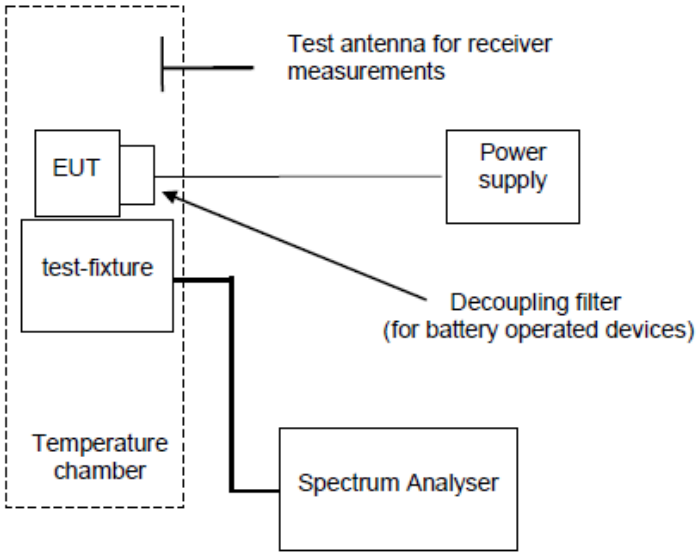
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Horn Antenna	R&S	HF906	CQA-012	2019/9/26	2020/9/25
Bilog Antenna	R&S	HL562	CQA-011	2019/9/26	2020/9/25
EMI Test Receiver	R&S	ESR7	CQA-005	2019/10/25	2020/10/24
Spectrum analyzer	R&S	FSU26	CQA-038	2019/10/25	2020/10/24
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2019/10/25	2020/10/24
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	CQA-022	2019/9/25	2020/9/24
high-low temperature chamber	Auchno	OJN-9606	CQA-S003	2019/9/25	2020/9/24
Signal generator	R&S	SME06	CQA-024	2019/9/26	2020/9/25
Vector signal generator	R&S	SMBV100A	CQA-039	2019/9/25	2020/9/24
DC power	KEYSIGHT	E3631A	CQA-028	2019/9/26	2020/9/25
RF Control Unit	Tonsced	JS0806-2	CQA-057	2019/9/26	2020/9/25
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2019/9/26	2020/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2019/9/26	2020/9/25
RF Cable (9KHz~40GHz)	CQA	N/A	C005	2019/9/26	2020/9/25

6 Radio Technical Requirements Specification in EN 300 440

6.1 Transmitter Requirements

6.1.1 Equivalent Isotropically Radiated Power

6.1.1.1 -6dB Bandwidth

Test Requirement:	EN 300 440 Clause 4.2.2.3.2		
Ambient:	Temp.: 25.5°C	Humid.: 59%	Press.: 1005 mbar
Test Status:	Test the unmodulated carrier at the highest, middle and the lowest channels under normal and extreme conditions.		
Equipment Used:	Refer to section 5 for details.		
Test Setup:			
Bandwidth Requirement:	≥1MHz channel bandwidth		
Test Result:	N/A		

Test Data:

ANT1:

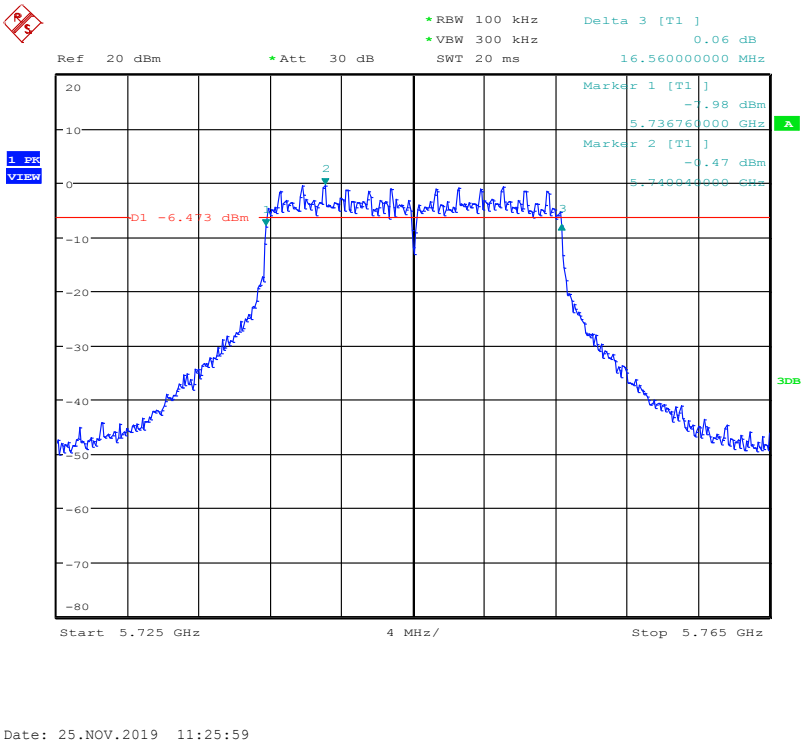
Channel (Frequency)	-6dB Bandwidth(MHz)	Requirement (MHz)	Conclusion
CH1 (5745MHz)	16.56	≥1MHz	N/A
CH26 (5785MHz)	16.56	≥1MHz	N/A
CH52 (5825MHz)	16.56	≥1MHz	N/A

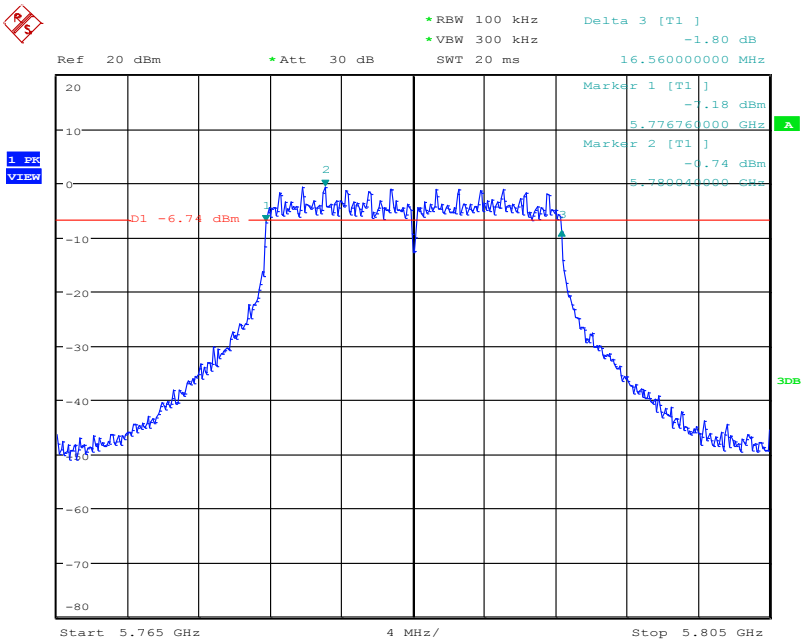
ANT2:

Channel (Frequency)	-6dB Bandwidth(MHz)	Requirement (MHz)	Conclusion
CH1 (5745MHz)	16.56	≥1MHz	N/A
CH26 (5785MHz)	16.56	≥1MHz	N/A
CH52 (5825MHz)	16.56	≥1MHz	N/A

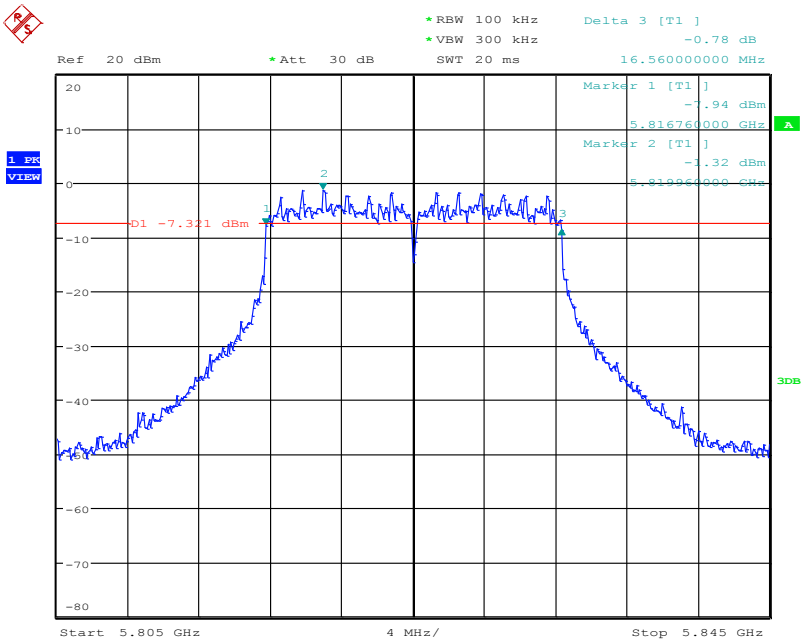
Test plot as follows:

ANT1:



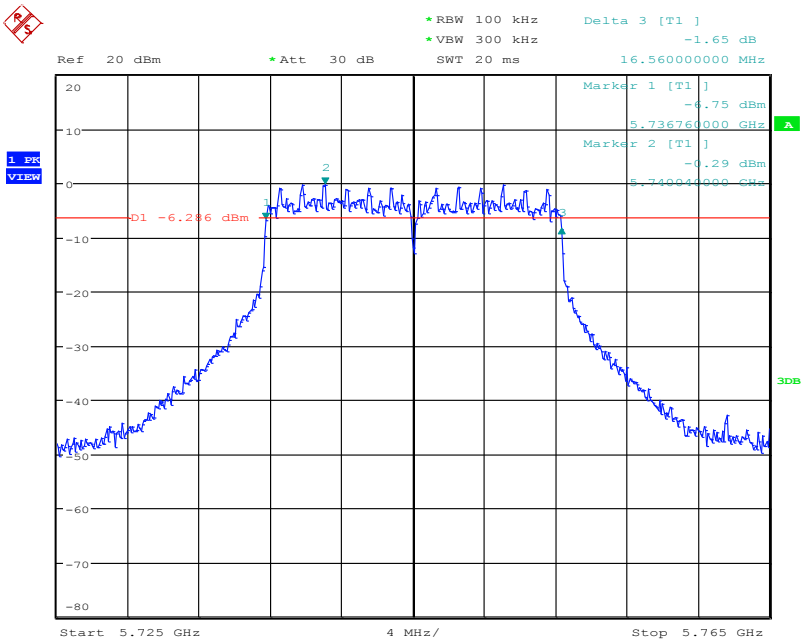


Date: 25.NOV.2019 11:27:36

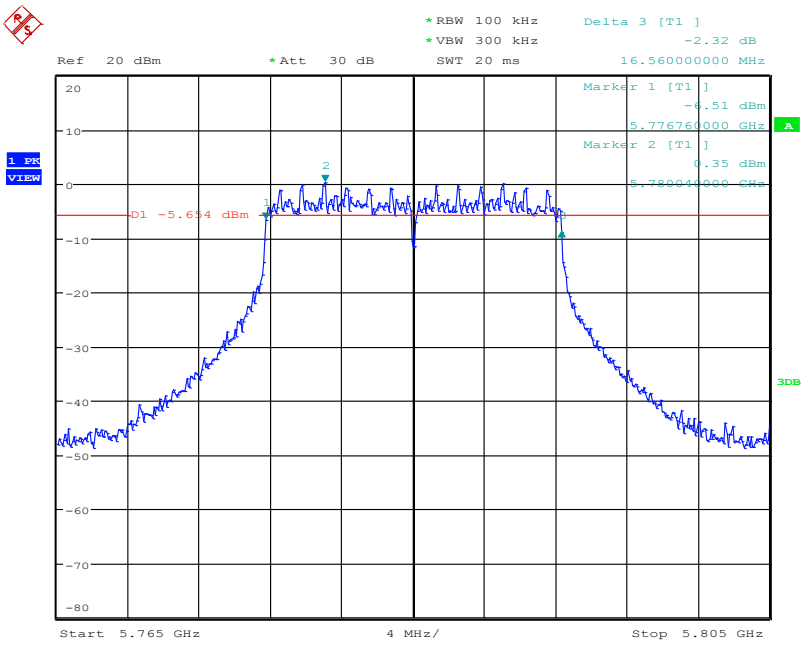


Date: 25.NOV.2019 11:29:29

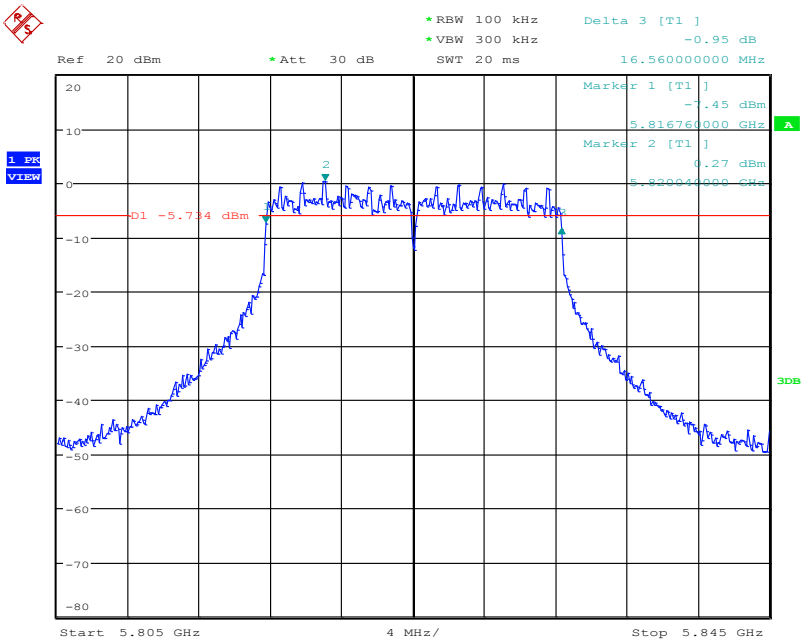
ANT2:



Date: 25.NOV.2019 10:52:52



Date: 25.NOV.2019 10:54:51

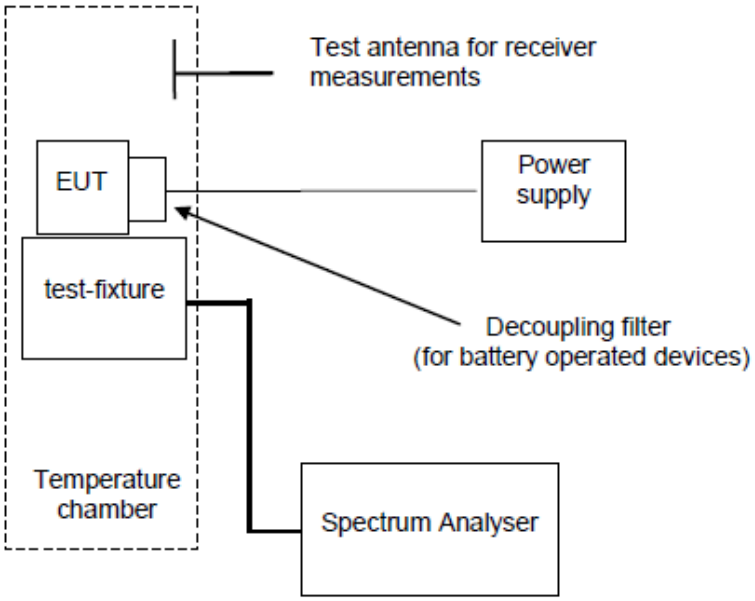


Date: 25.NOV.2019 10:57:06

6.1.1.2 Duty Cycle

Test Requirement:	EN 300 440 Clause 4.2.2.3.2		
Ambient:	Temp.: 25.5°C	Humid.: 59°C	Press.: 1005 mbar
Test Status:	Test the unmodulated carrier at the highest, middle and the lowest channels under normal and extreme conditions.		
Equipment Used:	Refer to section 5 for details.		

Test Setup:

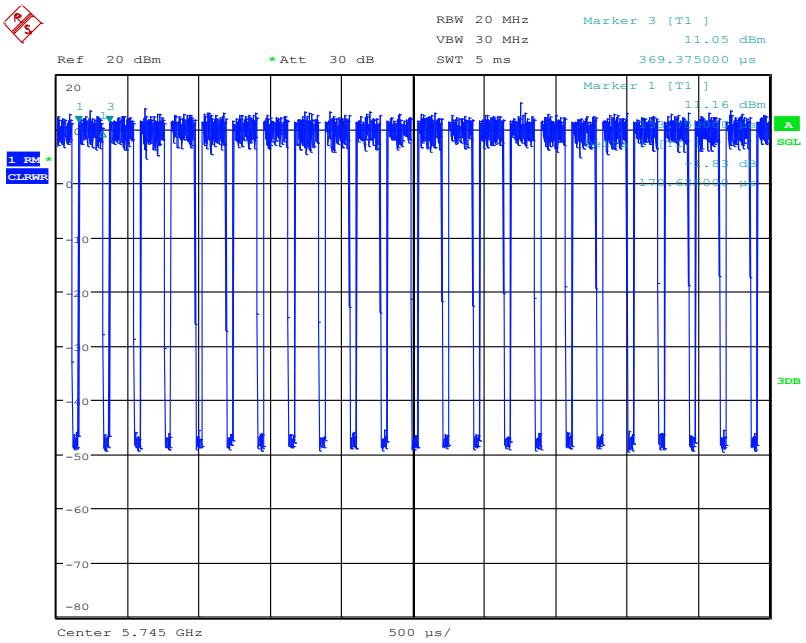


Duty Cycle Requirement: N/A

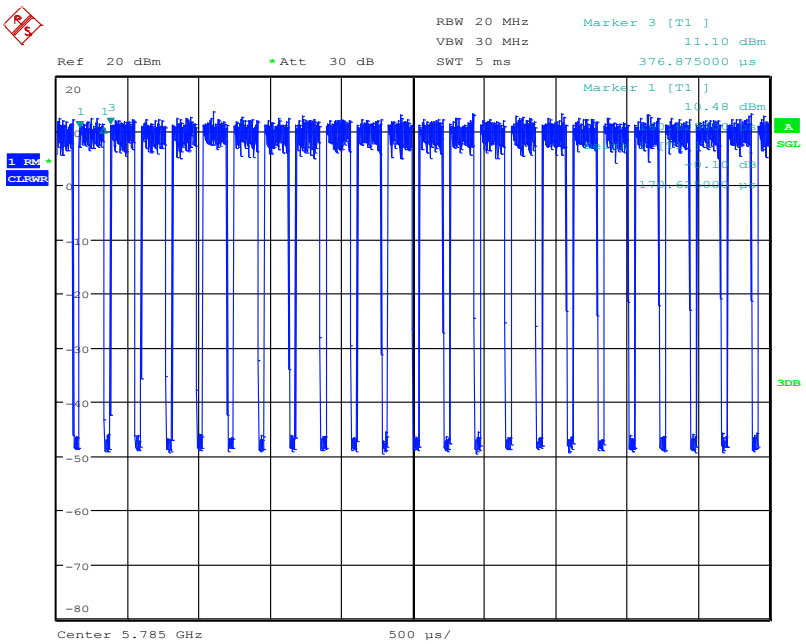
Test Result: N/A

Test plot as follows:

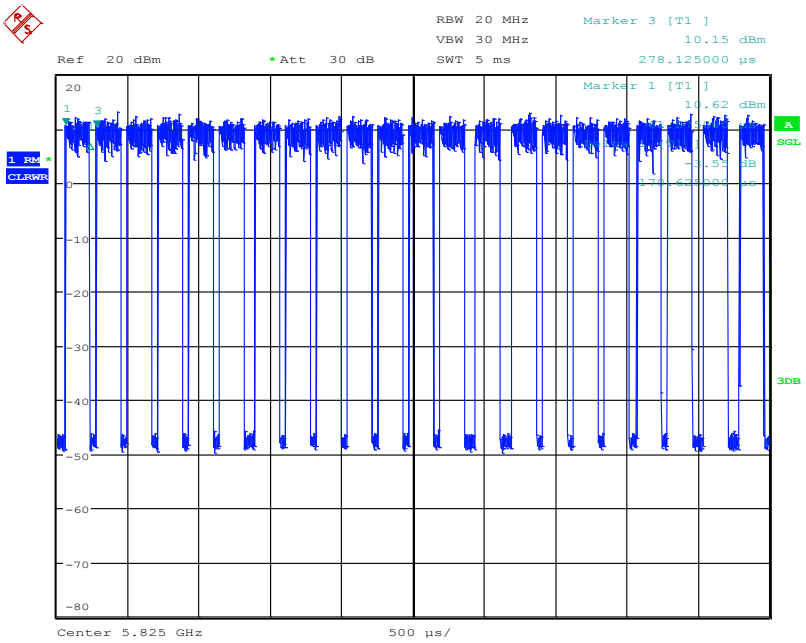
ANT1:



Date: 25.NOV.2019 11:31:16

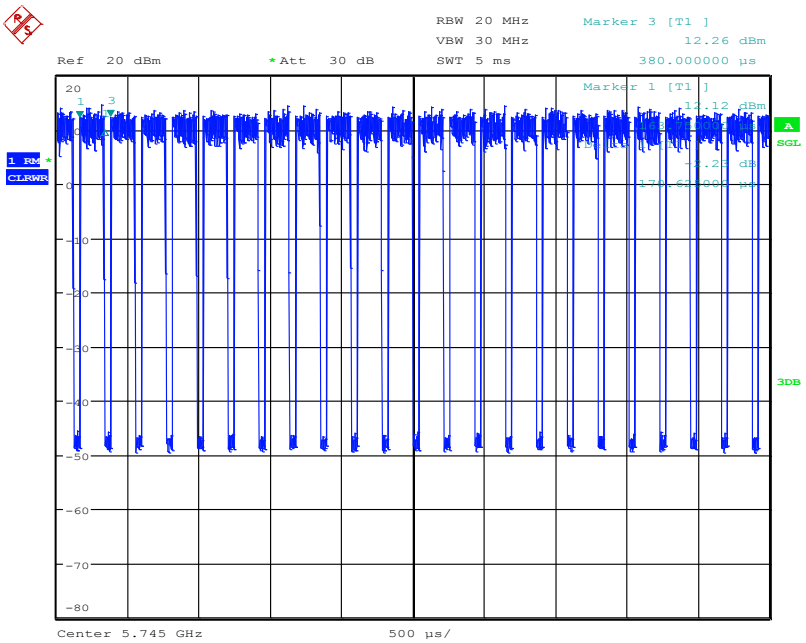


Date: 25.NOV.2019 11:33:55

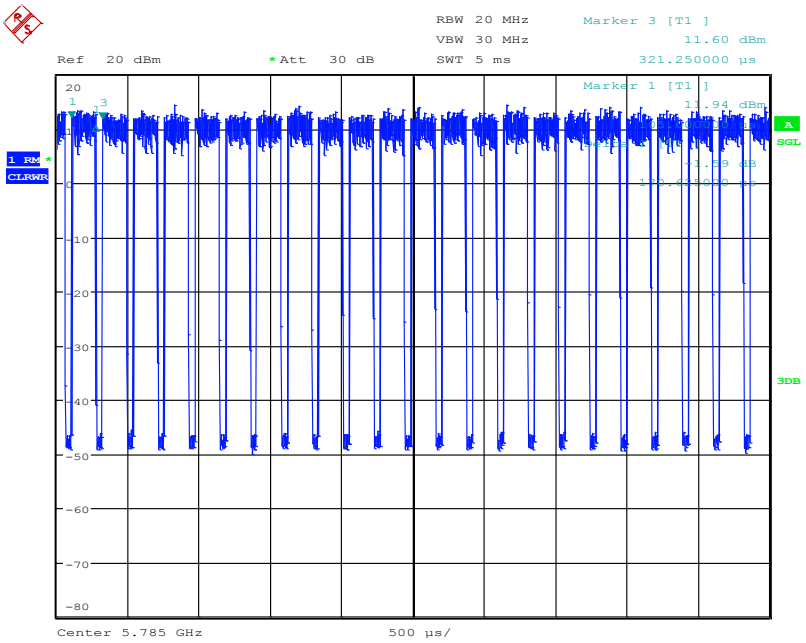


Date: 25.NOV.2019 11:36:18

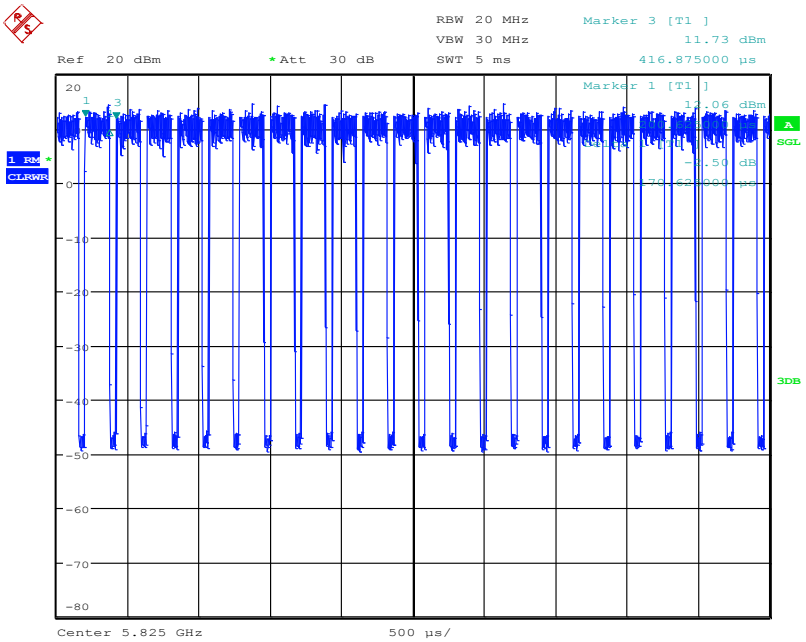
ANT2:



Date: 25.NOV.2019 11:00:41



Date: 25.NOV.2019 11:03:34



Date: 25.NOV.2019 11:05:44

6.1.1.3 Equivalent Isotropically Radiated Power

Test Requirement: EN 300 440 Clause 4.2.2

Ambient: Temp.: 25.9°C Humid.: 44% Press.:1005 mbar

Test Status: Test the unmodulated carrier at the highest, middle and the lowest channels under normal and extreme conditions.

Equipment Used: Refer to section 5 for details.

Test Setup:

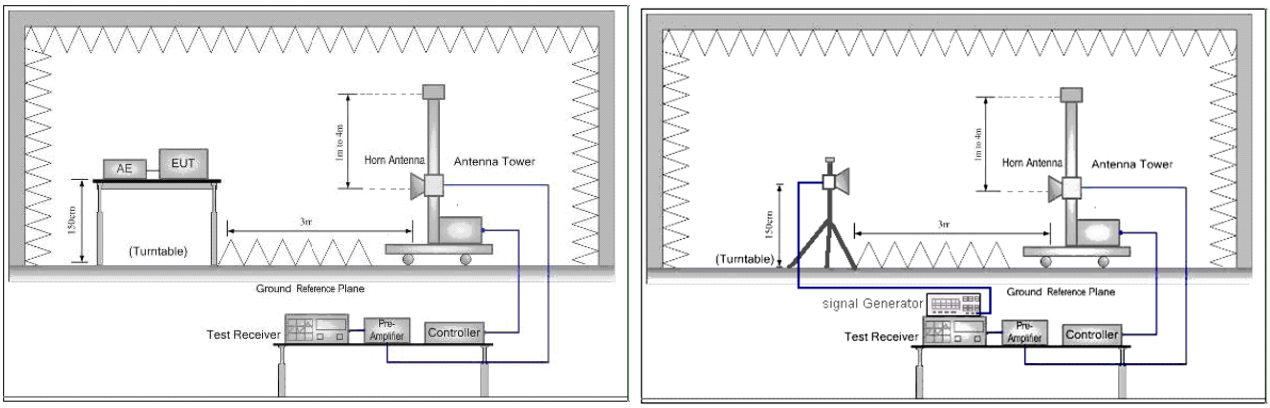
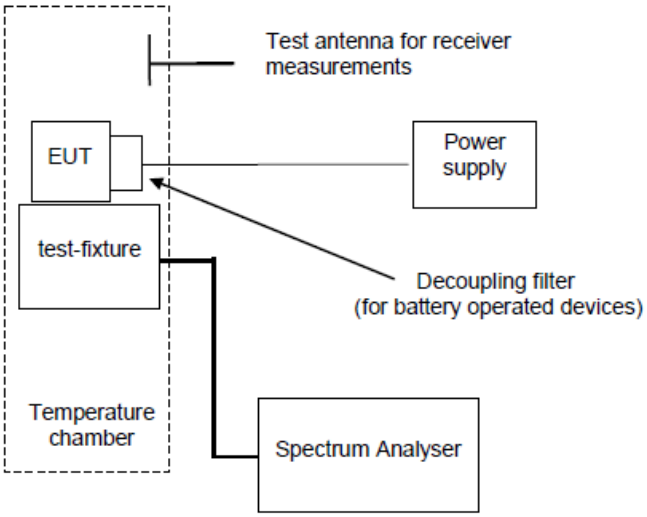


Figure 1. Above 1GHz(Normal Condition)

Test Setup:

(Extreme Condition)



Test Procedure:

Test procedure as below:

1) The EUT was powered ON and placed on a 1.5m hight table at a 3 meter fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
2) The EUT was set 3 meters (above 18GHz the distance is 1 meter) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the

transmitter.

6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
7) The output power into the substitution antenna was then measured.
8) Steps 6) and 7) were repeated with both antennas polarized.
9) Calculate power in dBm by the following formula:

EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)

EIRP=ERP+2.15dB

Where: Pg is the generator output power into the substitution antenna.
10) Test the EUT in the lowest channel ,middle channel, the Highest channel
11) Repeat above procedures until all frequencies measured was complete.

Limit: 14dBm

Test result: PASS

Test Data:

ANT1:

Test Conditions		Mode	Channel (Frequency)	EIRP Value (dBm)	Limit (dBm)	Result
Temp (℃)	Volt (V DC)					
Normal (25)	V_{norm}: 3.6	GFSK	CH1(5725MHz)	**10.48**	14	PASS
			CH26(5785MHz)	10.42	14	PASS
			CH52(5825MHz)	10.42	14	PASS
-20	V_{min}: 3.4	GFSK	CH1(5725MHz)	10.42	14	PASS
			CH26(5785MHz)	10.42	14	PASS
			CH52(5825MHz)	10.42	14	PASS
-20	V_{max}: 4.2	GFSK	CH1(5725MHz)	10.42	14	PASS
			CH26(5785MHz)	10.42	14	PASS
			CH52(5825MHz)	10.42	14	PASS
55	V_{min}: 3.4	GFSK	CH1(5725MHz)	10.42	14	PASS
			CH26(5785MHz)	10.42	14	PASS
			CH52(5825MHz)	10.42	14	PASS
55	V_{max}: 4.2	GFSK	CH1(5725MHz)	10.42	14	PASS
			CH26(5785MHz)	10.42	14	PASS
			CH52(5825MHz)	10.42	14	PASS
Remark: EIRP= Read EIRP value (dBm) + 10 log (1/x) X=duty cycle						

ANT2:

Test Conditions		Mode	Channel (Frequency)	EIRP Value (dBm)	Limit (dBm)	Result
Temp (℃)	Volt (V DC)					
Normal (25)	V_{norm}: 3.6	GFSK	CH1(5725MHz)	10.38	14	PASS
			CH26(5785MHz)	10.40	14	PASS
			CH52(5825MHz)	10.41	14	PASS
-20	V_{min}: 3.4	GFSK	CH1(5725MHz)	10.36	14	PASS
			CH26(5785MHz)	10.46	14	PASS
			CH52(5825MHz)	10.42	14	PASS
-20	V_{max}: 4.2	GFSK	CH1(5725MHz)	10.41	14	PASS
			CH26(5785MHz)	10.36	14	PASS
			CH52(5825MHz)	10.40	14	PASS
55	V_{min}: 3.4	GFSK	CH1(5725MHz)	10.37	14	PASS
			CH26(5785MHz)	10.40	14	PASS
			CH52(5825MHz)	10.41	14	PASS
55	V_{max}: 4.2	GFSK	CH1(5725MHz)	10.46	14	PASS
			CH26(5785MHz)	10.44	14	PASS
			CH52(5825MHz)	10.43	14	PASS
Remark: EIRP= Read EIRP value (dBm) + 10 log (1/x) X=duty cycle						

6.1.2 Permitted Range of Operating Frequencies

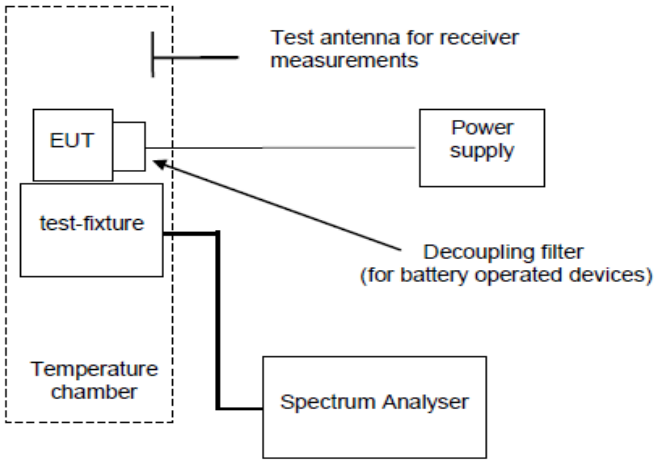
Test Requirement: EN 300 440 Clause 4.2.3

Ambient: Temp.: 25.5°C Humid.: 59% Press.: 1005 mbar

Test Status: Test the unmodulated carrier at the highest, middle and the lowest channels under normal and extreme conditions.

Equipment Used: Refer to section 5 for details.

Test Setup:



Limit: F_L>5.725GHz and F_H <5.875GHz（-30dBm）

Test result: PASS

Test Data:

ANT1:

Test Conditions		Mode	CH(Frequency)	Result(MHz)	Limit (MHz)	Conclusion
Temp (℃)	Volt (V DC)					
Normal (25)	V_{norm}: 3.6	GFSK	CH149(5725MHz	5736.24	>5725	PASS
			CH165(5825MHz	5835.75	<5875	PASS
-20	V_{min}: 3.4	GFSK	CH149(5725MHz	5735.40	>5725	PASS
			CH165(5825MHz	5836.11	<5875	PASS
-20	V_{max}: 4.2	GFSK	CH149(5725MHz	5735.26	>5725	PASS
			CH165(5825MHz	5834.98	<5875	PASS
55	V_{min}: 3.4	GFSK	CH149(5725MHz	5734.26	>5725	PASS
			CH165(5825MHz	5836.24	<5875	PASS
55	V_{max}: 4.2	GFSK	CH149(5725MHz	5736.03	>5725	PASS
			CH165(5825MHz	5834.56	<5875	PASS
Remark: Actual Test Line=-30dBm-10 log (1/x) X=duty cycle						

ANT2:

Test Conditions		Mode	CH(Frequency)	Result(MHz)	Limit (MHz)	Conclusion
Temp (℃)	Volt (V DC)					
Normal (25)	V_{norm}: 3.6	GFSK	CH149(5725MHz	5735.14	>5725	PASS
			CH165(5825MHz	5834.25	<5875	PASS
-20	V_{min}: 3.4	GFSK	CH149(5725MHz	5734.26	>5725	PASS
			CH165(5825MHz	5833.25	<5875	PASS
-20	V_{max}: 4.2	GFSK	CH149(5725MHz	5734.65	>5725	PASS
			CH165(5825MHz	5835.52	<5875	PASS
55	V_{min}: 3.4	GFSK	CH149(5725MHz	5734.45	>5725	PASS
			CH165(5825MHz	5834.75	<5875	PASS
55	V_{max}: 4.2	GFSK	CH149(5725MHz	5734.21	>5725	PASS
			CH165(5825MHz	5836.35	<5875	PASS
Remark: Actual Test Line=-30dBm-10 log (1/x) X=duty cycle						

6.1.3 Spurious Emissions

Test Requirement: EN 300 440 Clause 4.2.4

Ambient: Temp.: 25.9°C Humid.: 44% Press.: 1005 mbar

Test Status: Test the unmodulated carrier at the highest, middle and the lowest channels under normal and extreme conditions.

Receiver Setup:

Frequency range	Measuring receiver bandwidth	Detector mode
25MHz-1000MHz	120kHz	QP
1GHz-40GHz	1MHz	Peak

Equipment Used: Refer to section 5 for details.

Test Setup:

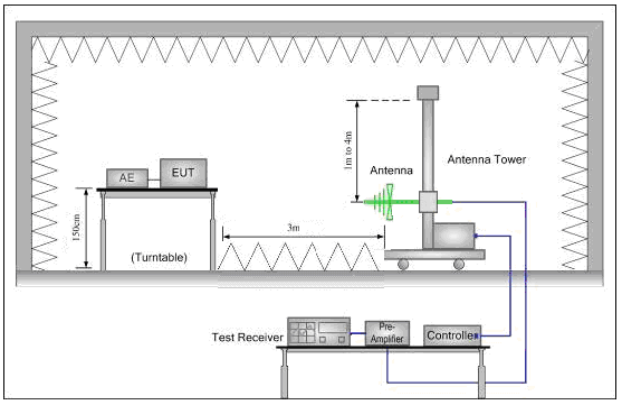


Figure 1. 25MHz to 1GHz

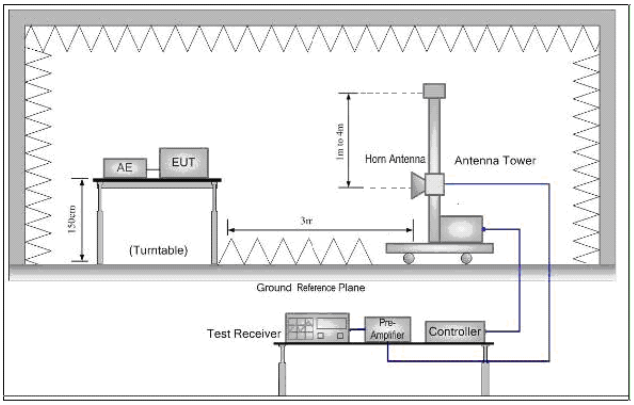


Figure 2. Above 1GHz

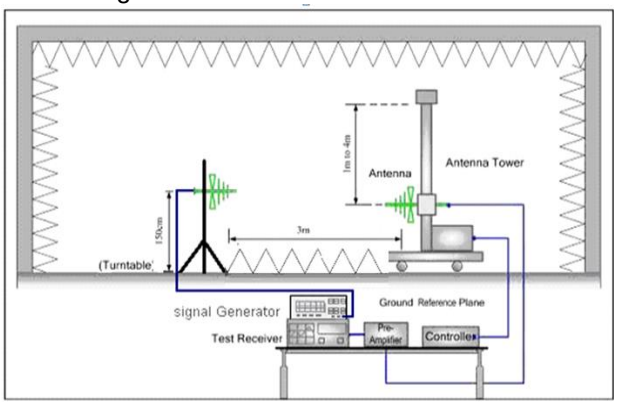


Figure 1. 25MHz to 1GHz

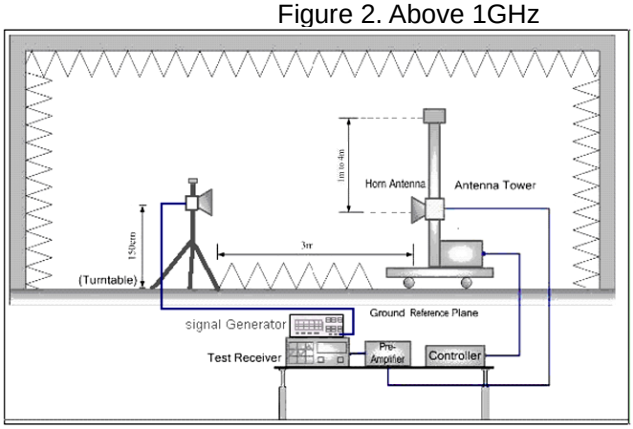


Figure 2. Above 1GHz

Test Procedure:

1 Scan from 25MHz to 40GHz; find the maximum radiation frequency to measure.

2 The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Test procedure as below:

1) The EUT was powered ON and placed on a 1.5m hight table at a 3 meter fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
2) The EUT was set 3 meters (above 18GHz the distance is 1 meter) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength

measurement was made.

4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
7) The output power into the substitution antenna was then measured.
8) Steps 6) and 7) were repeated with both antennas polarized.
9) Calculate power in dBm by the following formula:

ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)
EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)
EIRP=ERP+2.15dB

Where: Pg is the generator output power into the substitution antenna.

Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency ranges / state	47 MHz to 74 MHz 87.5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies ≤ 1000 MHz	Frequencies > 1000 MHz
Operating	4 nW	250 nW	1 μW
Standby	2 nW	2 nW	20 nW

Test result: PASS

Test Data:

ANT1:

Lowest channel (5745MHz)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
11490	150	254	-46.93	-30	-16.93	Pass	H
11490	150	185	-45.69	-30	-15.69	Pass	V
17235	150	146	-45.31	-30	-15.31	Pass	H
17235	150	84	-47.65	-30	-17.65	Pass	V

Highest channel (5825MHz)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
11650	150	113	-46.76	-30	-17.89	Pass	H
11650	150	65	-47.32	-30	-16.76	Pass	V
17475	150	354	-49.71	-30	-17.32	Pass	H
17475	150	95	-46.76	-30	-19.71	Pass	V

Standby mode							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
411.94	150	152	-65.70	-57	-8.70	Pass	H
411.94	150	95	-65.55	-57	-8.55	Pass	V
607.50	150	55	-64.16	-57	-7.16	Pass	H
607.50	150	68	-64.41	-57	-7.41	Pass	V
1085.34	150	99	-55.86	-47	-8.86	Pass	H
1085.34	150	156	-55.71	-47	-8.71	Pass	V
1234.69	150	325	-55.64	-47	-8.64	Pass	H
1234.69	150	255	-55.80	-47	-8.80	Pass	V

ANT2:

Lowest channel (5745MHz)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
11490	150	141	-46.66	-30	-16.66	Pass	H
11490	150	253	-45.62	-30	-15.62	Pass	V
17235	150	65	-47.81	-30	-17.81	Pass	H
17235	150	204	-46.63	-30	-16.63	Pass	V

Highest channel (5825MHz)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
11650	150	184	-44.08	-30	-14.08	Pass	H
11650	150	145	-44.31	-30	-14.31	Pass	V
17475	150	301	-42.51	-30	-12.51	Pass	H
17475	150	154	-43.08	-30	-13.08	Pass	V

Standby mode							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
444.71	150	114	-65.26	-57	-8.26	Pass	H
444.71	150	85	-64.38	-57	-7.38	Pass	V
611.27	150	341	-64.91	-57	-7.91	Pass	H
611.27	150	253	-65.90	-57	-8.90	Pass	V
1087.14	150	118	-55.10	-47	-8.10	Pass	H
1087.14	150	295	-56.31	-47	-9.31	Pass	V
1299.44	150	98	-56.60	-47	-9.60	Pass	H
1299.44	150	54	-55.07	-47	-8.07	Pass	V

Remark:
The disturbance above 1GHz /below 1GHz *was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.*

6.2 Receiver Requirements

Receiver Classification, Table 5 of EN 300 440.		
Receiver category	Relevant receiver clauses	Risk assessment of receiver performance
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).

The EUT (Receiver part) belong to Class 3.

6.2.1 Blocking or Desensitization

Test Requirement: EN 300 440 Clause 4.3.4

Test Results: Not applicable, since the test applied to class 1 or class 2 receivers only. Please refer to clause 4.3.1 of EN 300 440.

Test Requirement: EN 300 440 Clause 4.3.4

EUT Operation:

Ambient: Temp.: 25.5°C Humid.: 59% Press.: 1005 mbar

Test Status: Keep the Rx operating with receiver mode under normal test conditions.

Test Setup:

Far Field Calculation Formula

$$E = \frac{\sqrt{30PG(\theta,\phi)}}{r}$$

G = antenna gain relative to an isotropic antenna

θ,ϕ = elevation and azimuth angles to point of investigation

r = distance from observation point to the antenna

Equipment Used: Refer to section 6 for details.

Limit:

Limits for blocking or desensitization

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

The correction factor, k, is as follows:

k =-20log f-10 logBW

Where:

- f is the frequency in GHz;
- BW is the channel bandwidth in MHz.

The factor k is limited within the following:

0 < k < 40 dB.

Test result: PASS

Test data:

Receiver category	Bandwidth	Channel	Blocking test frequency	Test Value	Limit	Reslut
3	1MHz	5745MHz	50 times upper band edge of the receive channe	-52.25	-87.34	PASS
			20 times upper band edge of the receive channe	-54.25		PASS
			10 times upper band edge of the receive channe	-54.36		PASS
			10 times lower band edge of the receive channe	-54.05		PASS
			20 times lower band edge of the receive channe	-54.55		PASS
			50 times lower band edge of the receive channe	-53.02		PASS
		5785MHz	50 times upper band edge of the receive channe	-51.05	-87.45	PASS
			20 times upper band edge of the receive channe	-53.55		PASS
			10 times upper band edge of the receive channe	-55.95		PASS
			10 times lower band edge of the receive channe	-52.21		PASS
			20 times lower band edge of the receive channe	-51.52		PASS
			50 times lower band edge of the receive channe	-56.23		PASS
		5825MHz	50 times upper band edge of the receive channe	-50.30	-87.48	PASS
			20 times upper band edge of the receive channe	-52.50		PASS
			10 times upper band edge of the receive channe	-55.254		PASS
			10 times lower band edge of the receive channe	-54.25		PASS
			20 times lower band edge of the receive channe	-55.10		PASS
			50 times lower band edge of the receive channe	-53.65		PASS

6.2.2 Spurious Radiations

Test Requirement: EN 300 440 Clause 4.3.5

Ambient: Temp.: 25.9°C Humid.: 44% Press.: 1005mbar

Test Status:
1) Keep the EUT in continuously receiver with test single.
2) Keep the EUT searching and receiving the useful test signal.
3) Test EUT in normal conditions.

Receiver Setup:

Frequency range	Measuring receiver bandwidth	Detector mode
25MHz-1000MHz	120kHz	QP
1GHz-40GHz	1MHz	Peak

Equipment Used: Refer to section 5 for details.

Test Setup:

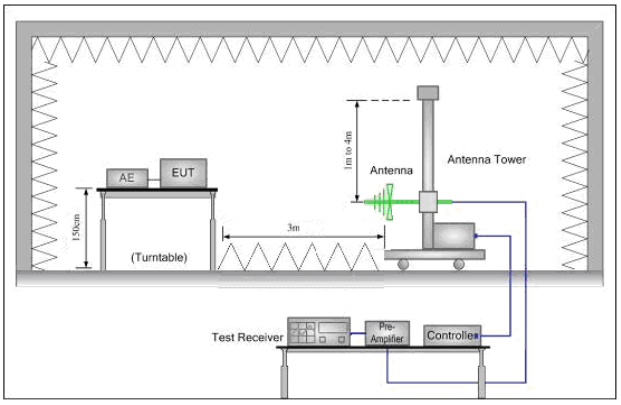


Figure 1. 25MHz to 1GHz

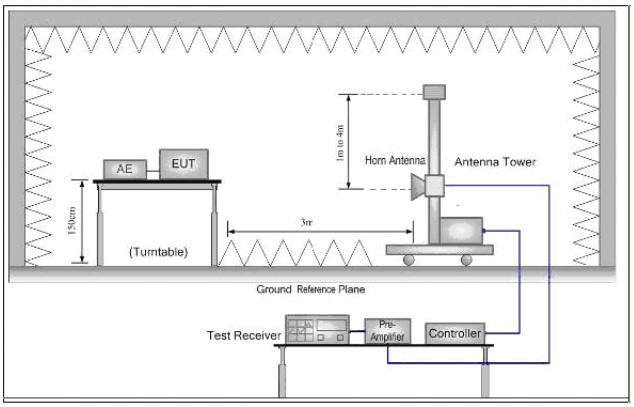


Figure 2. Above 1GHz

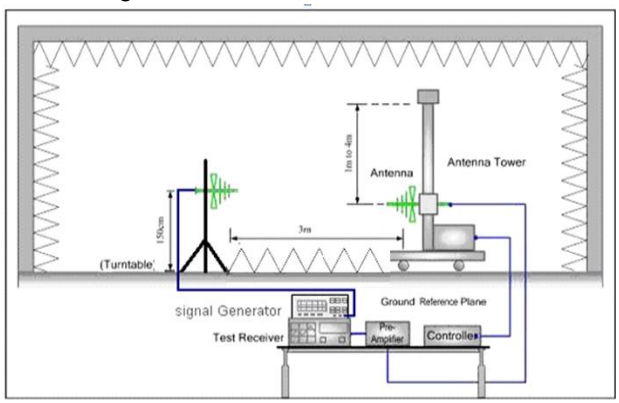


Figure 1. 25MHz to 1GHz

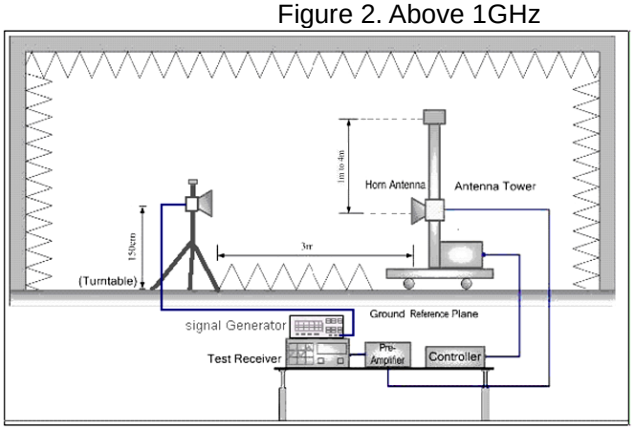


Figure 2. Above 1GHz

Test Procedure:

1. Scan from 25MHz to 40GHz; find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Test procedure as below:

1) The EUT was powered ON and placed on a 1.5m hight table at a 3 meter fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
2) The EUT was set 3 meters (above 18GHz the distance is 1 meter) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
7) The output power into the substitution antenna was then measured.
8) Steps 6) and 7) were repeated with both antennas polarized.
9) Calculate power in dBm by the following formula:

ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)
EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)
EIRP=ERP+2.15dB

Where: Pg is the generator output power into the substitution antenna.

10) Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency range	Limit
25MHz-1000MHz	2nW
1GHz-40GHz	20nW

Test result: PASS

Test Data:

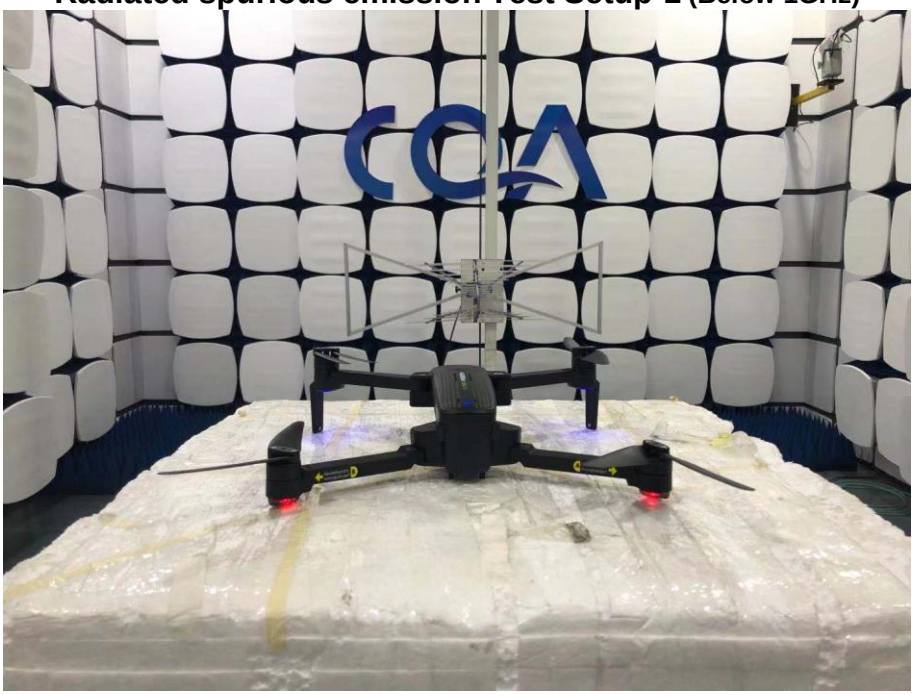
Lowest channel (5745MHz)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
415.61	179	225	-65.39	-57	-8.39	Pass	H
415.61	120	125	-64.58	-57	-7.58	Pass	V
609.29	192	141	-64.35	-57	-7.35	Pass	H
609.29	173	314	-64.92	-57	-7.92	Pass	V
1003.88	174	225	-65.99	-57	-8.99	Pass	H
1003.88	124	358	-64.91	-57	-7.91	Pass	V
1248.02	151	55	-64.58	-57	-7.58	Pass	H
1248.02	151	151	-65.73	-57	-8.73	Pass	V

Highest channel (5825MHz)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
420.03	100	122	-65.99	-57	-8.99	Pass	H
420.03	143	98	-64.91	-57	-7.91	Pass	V
645.81	192	125	-64.58	-57	-7.58	Pass	H
645.81	113	64	-65.73	-57	-8.73	Pass	V
1059.83	199	95	-56.07	-47	-9.07	Pass	H
1059.83	198	258	-56.22	-47	-9.22	Pass	V
1241.83	177	304	-56.45	-47	-9.45	Pass	H
1241.83	142	45	-56.59	-47	-9.59	Pass	V

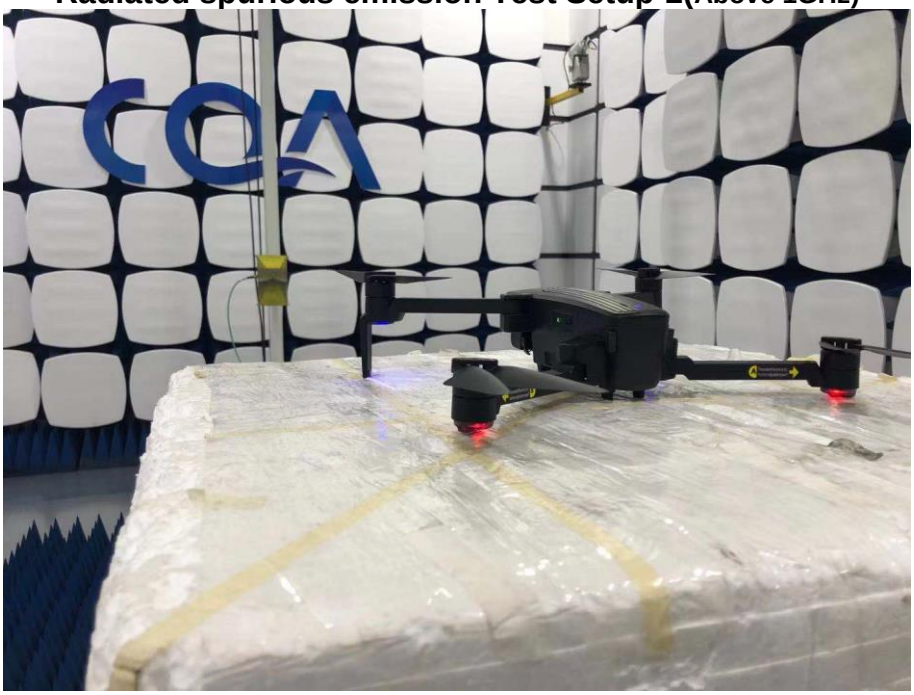
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: Zino Pro

Radiated spurious emission Test Setup-1 (Below 1GHz)



Radiated spurious emission Test Setup-2(Above 1GHz)



PHOTOGRAPHS OF EUT Constructional Details

Refer to APPENDIX 2 PHOTOGRAPHS OF EUT for CQASZ20191101174E-01.

*** End of Report ***