

TEST REPORT

FCC ID: 2AEXY002TX

Product: REMOTE CONTROLLER

Model No.: HT002

Additional Model: N/A

Trade Mark: Hubsan

Report No.: TCT160810E002

Issued Date: Aug. 19, 2016

Issued for:

SHENZHEN HUBSAN INTELLIGENT COMPANY LIMITED

13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road,
Nanshan District, Shenzhen, China

Issued By:

Shenzhen Tongce Testing Lab.

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1. Test Certification

Product:	REMOTE CONTROLLER
Model No.:	HT002
Additional Model:	N/A
Applicant:	SHENZHEN HUBSAN INTELLIGENT COMPANY LIMITED
Address:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China
Manufacturer:	DONGGUAN TENGSHENG INDUSTRIAL CO., LTD
Address:	A22# Luyi Street, Tianxin Village, Tangxia Town, Dongguan, China.
Date of Test:	Aug. 10 – Aug. 18, 2016
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Garen

Date: Aug. 18, 2016

Garen

Date: Aug. 19, 2016

Joe Zhou

Approved By:

Tomsin

Date: Aug. 19, 2016





2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	N/A
Field Strength of Fundamental	§15.249 (a)	PASS
Spurious Emissions	§2.1053 §15.249 (a) (d)/ §15.209	PASS
Band Edge	§2.1053 §15.249 (d)/ §15.205	PASS
20dB Occupied Bandwidth	§2.1049 §15.215 (c)	PASS

- 1. Pass: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.





3. EUT Description

Product Name:	REMOTE CONTROLLER
Model :	HT002
Additional Model:	N/A
Trade Mark:	Hubsan
Operation Frequency:	2420-2465MHz
Number of Channel:	10
Modulation Technology:	GFSK
Antenna Type:	Integral Antenna
Antenna Gain:	0dBi
Power Supply:	DC 3V (AAA 1.5V*2 Battery)

Operation Frequency Each of Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2420 MHz	5	2440MHz	9	2460MHz
2	2425 MHz	6	2445MHz	10	2465MHz
3	2430 MHz	7	2450MHz		
4	2435 MHz	8	2455MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2420MHz
The middle channel	2445MHz
The Highest channel	2465MHz



4. Genera Information

4.1. Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel

The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

4.2. 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.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
1	1 6) 1	(6) 1	

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.





5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Registration No.: 572331

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

CNAS - Registration No.: CNAS L6165
 Shenzhen TCT Testing Technology Co., Ltd. is accredited to ISO/IEC 17025:2005
 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6165.

5.2.Location

Shenzhen Tongce Testing Lab

Address: 1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China

Tel: 86-755-36638142

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item		MU
1	Conducted Emission		±2.56dB
2	RF power, conducted		±0.12dB
3	Spurious emissions, conducted	±0.11dB	
4	All emissions, radiated(<1GHz)	±3.92dB	
5	All emissions, radiated(>1GHz)	±4.28dB	
6	Temperature		±0.1°C
7	Humidity		±1.0%





6. Test Results and Measurement Data

6.1. Antenna Requirement

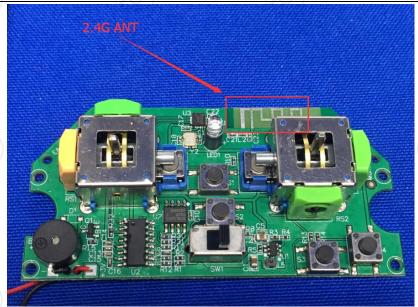
Standard requirement: FCC Part15 C Section 15.203

15.203 requirement:

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, 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.

E.U.T Antenna:

The EUT antenna is an integral antenna which permanently attached, and the best case gain of the antenna is 0dBi.





6.2.Conducted Emission

6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section	15.207	No.					
Test Method:	ANSI C63.10:2013							
Frequency Range:	150 kHz to 30 MHz	150 kHz to 30 MHz						
Receiver setup:	RBW=9 kHz, VBW=30	kHz, Sweep time	e=auto					
	Frequency range	Limit (dBuV)					
	(MHz)	Quasi-peak	Average					
Limits:	0.15-0.5	66 to 56*	56 to 46*					
	0.5-5	56	46					
	5-30	60	50					
	Refere	ence Plane	1201					
Test Setup:	Remark: E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Test table height=0.8m	J.T EMI Receiver	ter — AC power					
Test Mode:	Transmitting mode with	Transmitting mode with modulation						
Test Procedure:	1. The E.U.T and simulation power through a line (L.I.S.N.). This proimpedance for the magnetic power through a LI coupling impedance refer to the block photographs). 3. Both sides of A.C. conducted interferer emission, the relative the interface cables ANSI C63.10:2013 (conducted in the conducted in the conducted in the conducted interface cables and conducted in the conducte	e impedance stabovides a 50ohm neasuring equipm ses are also conne SN that provides with 50ohm term diagram of the line are checked nce. In order to find the positions of equals must be change	oilization network of 1/50uH coupling ent. ected to the main a 50ohm/50uH nination. (Please test setup and ed for maximum of the maximum ipment and all of led according to					
Test Result:	N/A, Power supply is DC 3V from AAA 1.5V*2 Battery, so not applicable.							



6.3. Radiated Emission Measurement

6.3.1. Test Specification

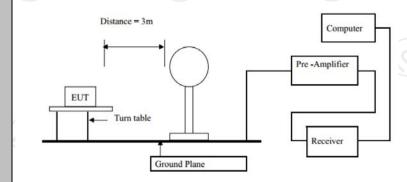
Test Requirement:	FCC Part15 C Section 15.209/ Part 2 J Section 2.1053				
Test Method:	ANSI C63.4: 2014 and ANSI C63.10:2013				
Frequency Range:	9 kHz to 25	GHz	C(I)		(c)
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal 8	& Vertical			
	Frequency 9kHz- 150kHz 150kHz-	Detector Quasi-peak Quasi-peak	RBW 200Hz 9kHz	VBW 1kHz 30kHz	Remark Quasi-peak Value Quasi-peak Value
Receiver Setup:	30MHz 30MHz-1GHz Above 1GHz	Quasi-peak Peak Peak	120kHz 1MHz 1MHz	300kHz 3MHz 10Hz	Quasi-peak Value Peak Value Average Value
Limit(Field strength of the fundamental signal):	Freque	ency	Limit (dBu\ 94.	//m @3m) 00	Remark Average Value Peak Value
Limit(Spurious Emissions):	Freque 0.009-0 0.490-1 1.705 30MHz-8 88MHz-2 216MHz-9 960MHz	0.490 1.705 -30 88MHz 16MHz 960MHz -1GHz	Limit (dBuV/m @3m) 2400/F(KHz) 24000/F(KHz) 30 40.0 43.5 46.0 54.0 74.0		Remark Quasi-peak Value Average Value Peak Value
Limit (band edge) :	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test Procedure:	 The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber in below 1GHz, 1.5m above the ground in above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make 				



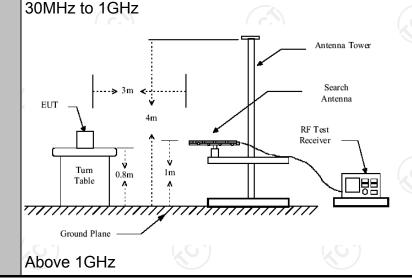
the measurement.

- 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

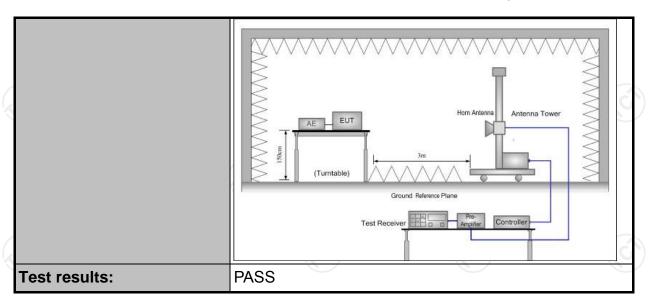
For radiated emissions below 30MHz



Test setup:







6.3.2. Test Instruments

			9	
ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 11, 2016
Spectrum Analyzer	ROHDE&SCHW ARZ	FSEM	848597/001	Sep. 11, 2016
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 12, 2016
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 11, 2016
Pre-amplifier	HP	8447D	2727A05017	Sep. 11, 2016
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 13, 2016
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 13, 2016
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 13, 2016
Horn Antenna	Schwarzbeck	BBHA 9170	373	Sep. 13, 2016
Coax cable	TCT	RE-low-01	N/A	Sep. 11, 2016
Coax cable	тст	RE-high-02	N/A	Sep. 11, 2016
Coax cable	тст	RE-low-03	N/A	Sep. 11, 2016
Coax cable	TCT	RE-high-04	N/A	Sep. 11, 2016
Antenna Mast	CCS	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).





6.3.3. Test Data

Field Strength of Fundamental

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
2420	86.25(PK)	Н	114/94	-7.75
2420	87.68(AV)	Н	114/94	-6.32
2445	88.09(PK)	Н	114/94	-5.91
2445	87.72(AV)	Н	114/94	-6.28
2465	88.45(PK)	(C)H	114/94	-5.55
2465	86.73(AV)	Н	114/94	-7.27
2420	86.60(PK)	V	114/94	-7.4
2420	85.02(AV)	V	114/94	-8.98
2445	87.56(PK)	V	114/94	-6.44
2445	86.81(AV)	V	114/94	-7.19
2465	86.67(PK)	V	114/94	-7.33
2465	85.86(AV)	V	114/94	-8.14

Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)		
		1		
		- (
(c)+	(G) - (G)	+(3)		

Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

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Frequency Range (30MHz-1GHz)

Horizontal:

Site



Limit: FCC Part 15B Class B RE_3 m

Polarization: Horizontal

Power: DC 3V

23 Temperature:

Humidity:

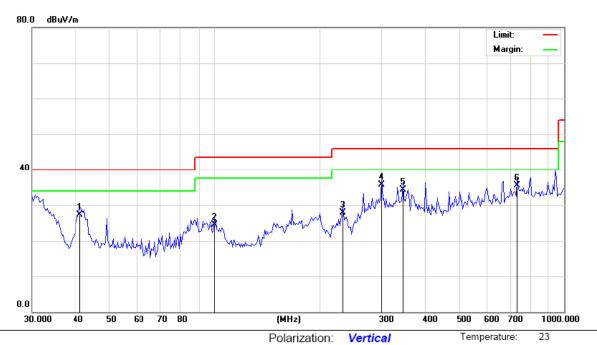
54 %

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		92.9973	38.60	-11.53	27.07	43.50	-16.43	QP		0	
2		200.0432	42.73	-9.82	32.91	43.50	-10.59	QP		0	
3		233.4881	43.92	-9.19	34.73	46.00	-11.27	QP		0	
4		468.1650	37.08	-3.53	33.55	46.00	-12.45	QP		0	
5		665.2610	35.94	0.72	36.66	46.00	-9.34	QP		0	
6	*	804.2522	34.19	5.03	39.22	46.00	-6.78	QP		0	





Vertical:



Site Polarization: Vertical Temperature: 23
Limit: FCC Part 15B Class B RE_3 m Power: DC 3V Humidity: 54 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		41.1580	37.31	-9.93	27.38	40.00	-12.62	QP		0	
2		99.7676	35.74	-11.20	24.54	43.50	-18.96	QP		0	
3		233.4881	37.15	-9.19	27.96	46.00	-18.04	QP		0	
4	*	300.6988	42.41	-6.70	35.71	46.00	-10.29	QP		0	
5		346.0740	40.04	-5.71	34.33	46.00	-11.67	QP		0	
6		734.0372	30.00	5.44	35.44	46.00	-10.56	QP		0	

Note: Measurements were conducted in all channels (high, middle, low), and the worst case (low channel) was submitted only.





Above 1GHz

	Low channel: 2420MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emissic Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
2390.00	Н	50.67		-4.20	46.47		74.00	54.00	-7.53	
2390.00	Н		48.19	-4.20	J	43.99	74.00	54.00	-10.01	
4840.00	Н	52.48		-3.94	48.54		74.00	54.00	-5.46	
7260.00	Н	46.65		0.52	47.17		74.00	54.00	-6.83	
	4-							<i></i>		
	(O)		120					$(\mathcal{L}_{\mathcal{L}})$		
2390.00	V	50.36		-4.20	46.16	<u> </u>	74.00	54.00	-7.84	
2390.00	V		49.43	-4.20		45.23	74.00	54.00	-8.77	
4840.00	V	46.62		-3.94	42.68		74.00	54.00	-11.32	
7260.00	V	48.27		0.52	47.79		74.00	54.00	-6.21	
9 /		72 /		\	<i>)</i>		K-2-/			

	Middle channel: 2445MHz									
Frequency	Ant. Pol.	Peak	AV	Correction		n Level	Peak limit	AV limit	Margin	
(MHz)	H/V	reading (dBµV)	reading (dBµV)	Factor (dB/m)	Peak (dBµV/m)	AV (dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	
4890.00	Н	51.29		-3.98	47.31		74.00	54.00	-6.69	
7335.00	Н	48.80		0.57	49.37		74.00	54.00	-4.63	
					X\		-			
(C)		(<u>,</u> -G)		(20	<u></u> (`ر		(C_{\bullet})		{ _X C	
V					/ 					
4890.00	V	51.09		-3.98	47.11		74.00	54.00	-6.89	
7335.00	V	49.34		0.57	49.91	<u> </u>	74.00	54.00	-4.09	
	(0.1)		-1/0)		(O.)		(40)		
	<u> </u>									

				High channe	el: 2465MH	łz			
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
2486.58	Н	50.08		-2.38	47.70		74.00	54.00	-6.30
2486.58	Н		46.34	-2.38	(43.96	74.00	54.00	-10.04
4930.00	Н	50.62		-3.98	46.64	<u></u>	74.00	54.00	-7.36
7395.00	Н	49.57		0.57	50.14		74.00	54.00	-3.86
						-			
					Z \				
2483.51	V	52.61		-2.38	49.23	-	74.00	54.00	-4.77
2483.51	V		45.25	-2.38	<i></i>	42.87	74.00	54.00	-11.13
4930.00	V	51.83		-3.98	47.85		74.00	54.00	-6.15
7395.00	V	47.24		0.57	47.81		74.00	54.00	-6.19
	44			<u></u>					

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.



Band Edge Requirement

Low chann	_ow channel: 2420 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emissic Peak (dBµV/m)	AV	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
2400	Н	52.30)	-4.2	48.10		74.00		-25.90	
2400	Н		42.35	-4.2)	38.15	-	54.00	-15.85	
2400	V	48.50	(.	-4.2	44.30		74.00	(.6)	-29.70	
2400	V		43.62	-4.2		39.42		54.00	-14.58	

High chanr	High channel: 2465MHz										
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)		
2483.5	H	52.45		-4.2	48.25	-	74.00		-25.75		
2483.5	(AB)		40.07	-4.2		35.87		54.00	-18.13		
		-	-	<u> </u>	-						
2483.5	V	51.66		-4.2	47.46		74.00		-26.54		
2483.5	V		41.75	-4.2		37.55		54.00	-16.45		
<u> </u>		-40	/	'	- -		40		🖔		

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. $Margin (dB) = Emission Level (Peak/Average)(dB\mu V/m)-(Peak/Average) limit (dB\mu V/m)$
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.





6.4.20dB Occupied Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)/ Part 2 J Section 2.1049
Test Method:	ANSI C63.10: 2013
Limit:	N/A
	 According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. Set to the maximum power setting and enable the EUT transmit continuously. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW≥1% of the 20 dB bandwidth; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold. Measure and record the results in the test report.
Test setup:	Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test results:	PASS

6.4.2. Test Instruments

RF Test Room								
Equipment Manufacturer Model Serial Number Calibration Due								
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 12, 2016				

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).





6.4.3. Test data

Test Channel	20dB Occupy Bandwidth (kHz)	Limit	Conclusion
Lowest	134.62	(8)	PASS
Middle	121.79		PASS
Highest	121.79	<u></u>	PASS

Test plots as follows:

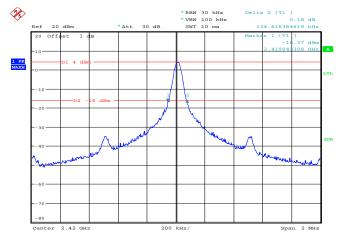


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Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

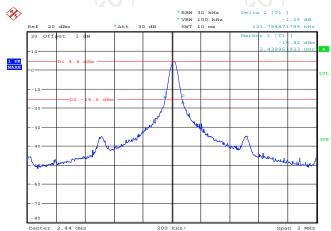


Lowest channel



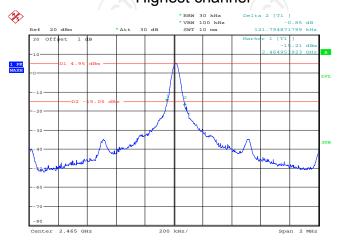
Date: 18.AUG.2016 18:05:21

Middle channel



Date: 18.AUG.2016 18:07:19

Highest channel



Date: 18.AUG.2016 18:08:03

*****END OF REPORT****