

TEST REPORT

FCC ID: 2AHTWFMT-9

Product: Bluetooth CAR FM TRANSMITTER

Model No.: FMT-9

Additional Model: FMT-10, FMT-11, FMT-12, FMT-13, FMT-14, FMT-15, FMT-16, FMT-17, FMT-18, FMT-19, FMT-20, FMT-21, FMT-22, FMT-23, FMT-24, FMT-25,

FMT-26, FMT-27, FMT-28, FMT-29, FMT-30

Trade Mark: QFX

Report No.: TCT160324E019

Issued Date: Mar. 31, 2016

Issued for:

Max Deluxe Limited

Room 1101, 11th floor Concordia plaza, 1 Science Museum Road, Tsim Sha

Tusi, Kowloon, Hong kong

Issued By:

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1. Test Certification

Product:	Bluetooth CAR FM TRANSMITTER		
Model No.:	FMT-9		
Additional Model No.:	FMT-10, FMT-11, FMT-12, FMT-13, FMT-14, FMT-15, FMT-16, FMT-17, FMT-18, FMT-19, FMT-20, FMT-21, FMT-22, FMT-23, FMT-24, FMT-25, FMT-26, FMT-27, FMT-28, FMT-29, FMT-30		
Applicant:	Max Deluxe Limited		
Address: Room 1101, 11th floor Concordia plaza, 1 Science Museur Tsim Sha Tusi, Kowloon, Hong kong			
Manufacturer:	SAGE HUMAN ELECTRONICS INTERNATIONAL CO., LIMITED		
Address:	3/F, BUILDING A, RONGLI INDUSTRY PARK, GUANLAN TOWN, LONGHUA NEW DISTRICT, SHENZHEN, CHINA		
Date of Test:	Mar. 24 – Mar. 30, 2016		
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.239		

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: SKY Luo

SKY Luo

Date: Mar. 30, 2016

SKY Luo

Date: Mar. 31, 2016

Joe Zhou

Approved By: Date: Mar. 31, 2016

Tomsin



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 the fundamental signal	§15.239 (b)		PASS
Spurious emissions	§15.239 (b) (c)/ §15.209/ §2.1053		PASS
Occupied Bandwidth	§15.215 (c)/§2.1049		PASS

Note:

- 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:	Bluetooth CAR FM TRANSMITTER
Model:	FMT-9
Additional Model:	FMT-10, FMT-11, FMT-12, FMT-13, FMT-14, FMT-15, FMT-16, FMT-17, FMT-18, FMT-19, FMT-20, FMT-21, FMT-22, FMT-23, FMT-24, FMT-25, FMT-26, FMT-27, FMT-28, FMT-29, FMT-30
Trade Mark:	QFX
Operation Frequency:	88.1-107.9MHz
Channel Separation:	100 kHz
Number of Channel:	199CH(See NOTE 2)
Modulation Technology:	FM
Antenna Type:	Internal Antenna
Antenna Gain:	0dBi
Power Supply:	DC 12V from battery
Remark:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

Operation Frequency Each of Channel

<u>oporation</u>	oquonoy	<u> </u>	Onamic				
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	88.1MHz				1	199	107.9MHz
2	88.2MHz	99	97.9MHz				
)	100	98.0MHz	198	107.8MHz		(0)

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	88.1MHz
The middle channel	97.1MHz
The Highest channel	107.9MHz





4. Genera Information

4.1. Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation

The sample was placed 0.8m 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
Mobile Phone	A1586	1	BCG-E2816A	Apple
DC Power	GPR-3060D	EL864290		GWINSTEK

Note:

- 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.

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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 TCT Testing Technology Co., Ltd.

Address: 1F, Building 1, Yibaolai Industrial Par Qiaotou Village, Fuyong Town Shenzhen, China

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(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±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 /247(c)

15.203 requirement:

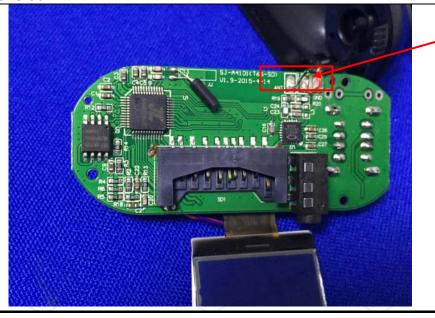
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The FM antenna is a wire antenna which permanently attached, and the best case gain of the antenna is 0dBi.



Antenna

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6.2. Conducted Emission

6.2.1. Test Specification

	Τ					
Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Frequency Range:	150 kHz to 30 MHz					
Receiver setup:	RBW=9 kHz, VBW=30	RBW=9 kHz, VBW=30 kHz, Sweep time=auto				
Limits:	Frequency range (MHz) 0.15-0.5 0.5-5 5-30	Limit (c Quasi-peak 66 to 56* 56 60	BuV) Average 56 to 46* 46 50			
Test Setup:	Reference Plane LISN 40cm 80cm Filter AC power Equipment E.U.T Remark E.U.T Equipment Under Test LISN: Line Impedence Stabilization Network					
Test Mode:	Refer to section 4.1 for	details				
Test Procedure:	 The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 					
Test Result:	The EUT is powered by	car's power DC	12V, So not applicable.			



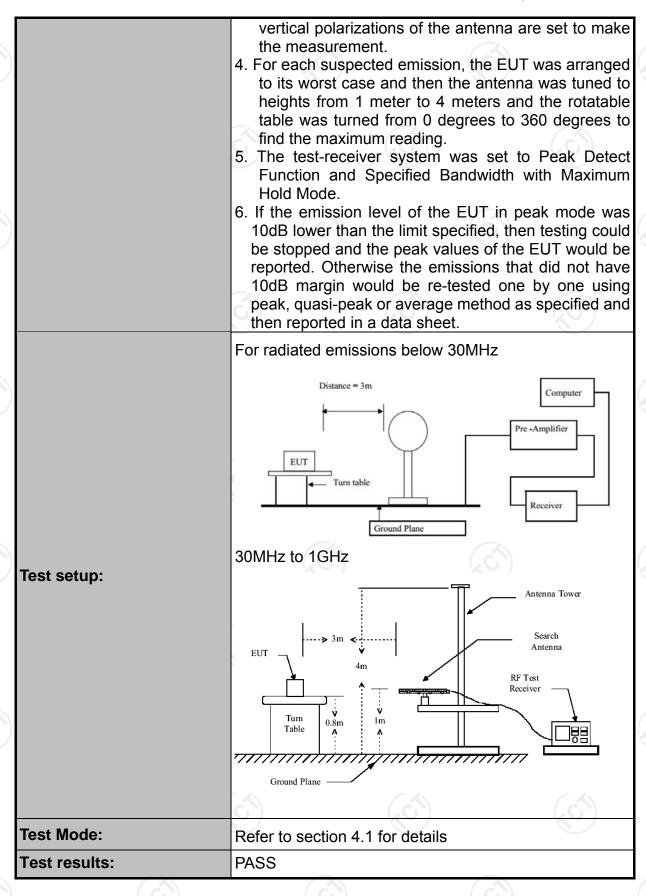


6.3. Radiated Emission Measurement

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209&Part 2 J Section 2.1053					
Test Method:	ANSI C63.10: 2013					
Frequency Range:	9 kHz to 1 G	9 kHz to 1 GHz				
Measurement Distance:	3 m					
Antenna Polarization:	Horizontal &	Horizontal & Vertical				
	Frequency	Detector	RBW	VBW	Remark	
	9kHz- 150kHz	Quasi-peal		1kHz	Quasi-peak Value	
Receiver Setup:	150kHz- 30MHz	Quasi-peal		30kHz	Quasi-peak Value	
	30MHz-1GHz	Quasi-peal		300KHz	Quasi-peak Value	
	Frequer	ncy	Limit (dB @3n		Remark	
	88-108M	/Hz	48		Average Value	
		7	68		Peak Value ny emissions within	
	paragrap employin	oh is bas ng an avera	ed on me	easuremer r. The pro	ission limit in this nt instrumentation ovisions in Section	
	Frequency Limit (dBuV/m		m @3m)	Remark		
	30MHz-88		40.0		Quasi-peak Value	
Limit(Spurious Emissions):			43.5		Quasi-peak Value	
	216MHz-960MHz		46.0		Quasi-peak Value	
	960MHz-1GHz 54.0 Quasi-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 camber 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 					









6.3.2. Test Instruments

Radiated Emission Test Site (966)								
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due				
ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 11, 2016				
Spectrum Analyzer	ROHDE&SCHW ARZ	FSEM	848597/001	Sep. 11, 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				
Coax cable	тст	N/A	N/A	Sep. 12, 2016				
Coax cable	TCT	N/A	N/A	Sep. 12, 2016				
Coax cable	тст	N/A	N/A	Sep. 12, 2016				
Coax cable	TCT	N/A	N/A	Sep. 12, 2016				
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)
88.10	32.74(AV)	Н	48	15.26
88.10	34.73(PK)	Н	68	33.27
88.10	27.02(AV)	V	48	20.98
88.10	28.02(PK)	V	68	39.98

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
97.10	33.75(AV)	Н	48	14.25
97.10	35.93(PK)	Н	68	32.07
97.10	25.86(AV)	V	48	22.14
97.10	26.74(PK)	V	68	41.26

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
107.9	28.69(AV)	Н	48	19.31
107.9	29.14(PK)	H	68	38.86
107.9	21.02(AV)	V	48	26.98
107.9	22.11(PK)	V	68	45.89

Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)	
(5)	-		
(80)	<u> </u>	()	

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

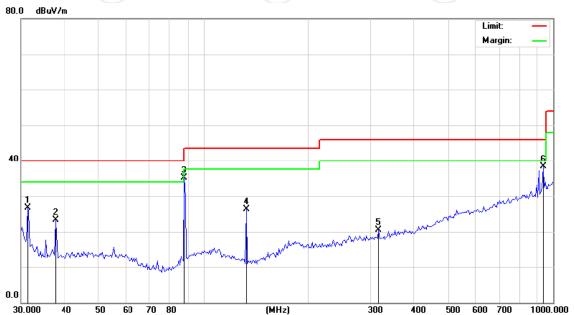


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Frequency Range (30MHz-1GHz)

88.10MHz

Horizontal:

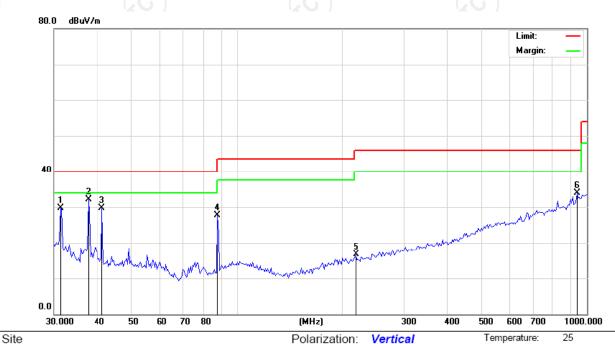


Site Polarization: Horizontal Temperature: 2
Limit: FCC Part 15B Class B RE_3 m Power: DC12V Humidity: 54 %

Reading Correct Measure-Antenna Table Limit Over No. Mk. Freq. Level Factor ment Height Degree dBuV dΒ MHz dBuV/m dBuV/m dΒ Detector cm degree Comment 31.2918 -13.56 40.17 26.61 40.00 -13.390 1 peak 2 37.5647 36.13 -12.78 23.35 40.00 -16.65 peak 0 87.9136 48.72 -13.68 35.04 40.00 -4.96 0 3 peak 4 132.1490 41.40 -15.11 26.29 43.50 -17.21 peak 0 -25.43 5 315.8600 28.50 -7.93 20.57 46.00 0 peak 6 938.7138 34.23 3.99 38.22 46.00 -7.78 0 peak



Vertical:



Limit: FCC Part 15B Class B RE_3 m

Polarizati	on: vertica	ı	remperature.	20
Power:	DC12V		Humidity:	54 %
		Antenna	Table	

	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		31.2918	43.34	-13.56	29.78	40.00	-10.22	peak		0	
_	2	*	37.5647	44.88	-12.78	32.10	40.00	-7.90	peak		0	
_	3		41.1580	42.07	-12.43	29.64	40.00	-10.36	peak		0	
	4		87.9136	41.48	-13.68	27.80	40.00	-12.20	peak		0	
_	5		219.1785	27.68	-11.02	16.66	46.00	-29.34	peak		0	
_	6		938.7138	29.88	3.99	33.87	46.00	-12.13	peak		0	





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Report No.: TCT160324E019

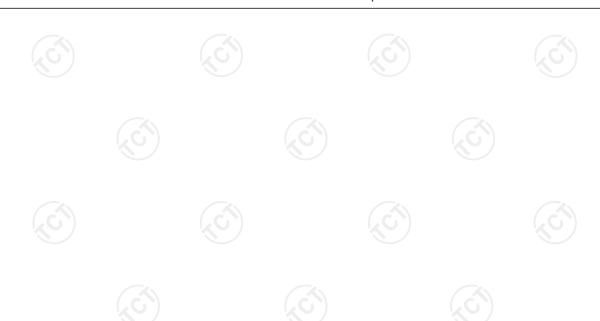
97.10MHz





Temperature: 25 Site Polarization: Horizontal DC12V Limit: FCC Part 15B Class B RE_3 m Power: Humidity: 54 %

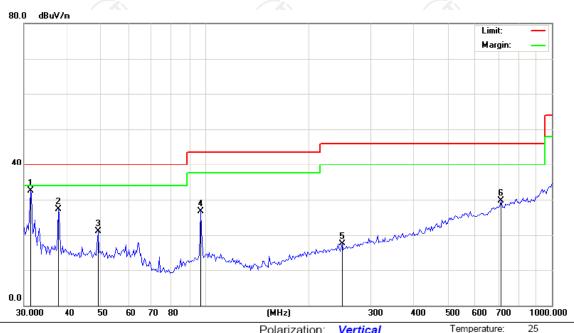
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment	
1	*	31.2918	43.52	-13.56	29.96	40.00	-10.04	peak		0		
2		37.5647	35.76	-12.78	22.98	40.00	-17.02	peak		0		
3		97.0023	45.05	-11.90	33.15	43.50	-10.35	peak		0		
4	2	238.4626	28.82	-10.36	18.46	46.00	-27.54	peak		0		
5	į	531.2910	29.13	-2.64	26.49	46.00	-19.51	peak		0		
6	7	776.4850	28.30	1.15	29.45	46.00	-16.55	peak		0		





Vertical:

Site



Limit: FCC Part 15B Class B RE_3 m

Polarization: Vertical Temperature: DC12V Power:

Humidity: 54 %

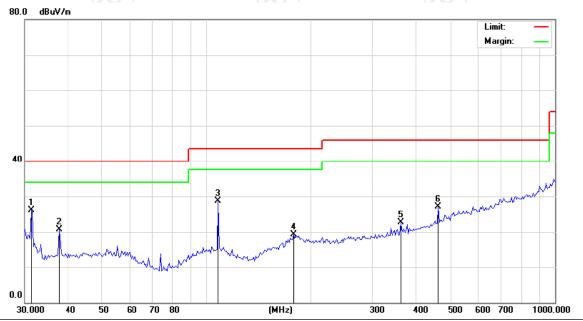
Reading Correct Measure-Antenna Table Limit Over No. Mk. Freq. Level Factor ment Height Degree dΒ MHz dBuV dΒ dBuV/m dBuV/m Detector degree Comment 31.2920 1 46.15 -13.56 32.59 40.00 -7.41 peak 0 2 37.5648 40.07 -12.78 27.29 40.00 -12.71 0 peak 3 49.0627 33.21 -12.08 21.13 40.00 -18.87 peak 0 97.0023 38.70 -11.90 26.80 43.50 -16.70 0 4 peak 248.7320 27.43 -10.01 17.42 46.00 -28.58 0 5 peak 29.69 0 6 713.6917 29.38 0.31 46.00 -16.31 peak





107.9MHz

Horizontal:



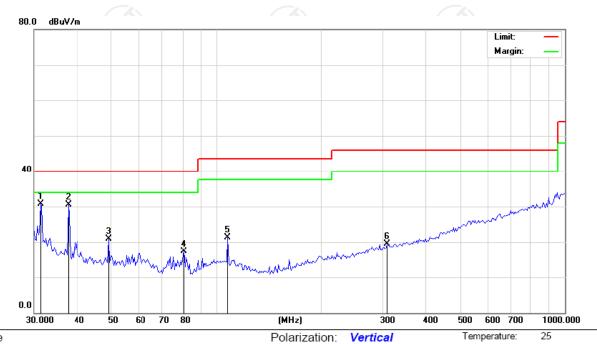
Site Polarization: Horizontal Temperature: 25
Limit: FCC Part 15B Class B RE_3 m Power: DC12V Humidity: 54 %

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	*	31.2918	39.73	-13.56	26.17	40.00	-13.83	peak		0		
2		37.5647	33.44	-12.78	20.66	40.00	-19.34	peak		0		
3		107.7853	40.54	-11.86	28.68	43.50	-14.82	peak		0		
4		177.5178	32.46	-13.24	19.22	43.50	-24.28	peak		0		
5		360.9775	29.78	-6.99	22.79	46.00	-23.21	peak		0		
- 6		461.6313	31.24	-4.21	27.03	46.00	-18.97	peak		0		





Vertical:



Site Polarization: Vertical Temperature: 22
Limit: FCC Part 15B Class B RE_3 m Power: DC12V 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	*	31.2918	44.22	-13.56	30.66	40.00	-9.34	peak		0	
-	2		37.5647	43.37	-12.78	30.59	40.00	-9.41	peak		0	
-	3		49.0626	32.95	-12.08	20.87	40.00	-19.13	peak		0	
-	4		80.8041	33.31	-16.07	17.24	40.00	-22.76	peak		0	
K	5	1	07.7853	33.10	-11.86	21.24	43.50	-22.26	peak		0	
-	6	3	309.2710	27.52	-8.07	19.45	46.00	-26.55	peak		0	

Remark: The data show that the restricted band (108-121.94 MHz) meet the limit requirement.





6.4. 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:	200kHz
Test Procedure:	 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:	Refer to section 4.1 for details
Test results:	PASS

6.4.2. Test Instruments

RF Test Room									
Equipment	Manufacturer	Model	Serial Number	Calibration Due					
Spectrum Analyzer	R&S	FSU	200054	Sep. 11, 2016					

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

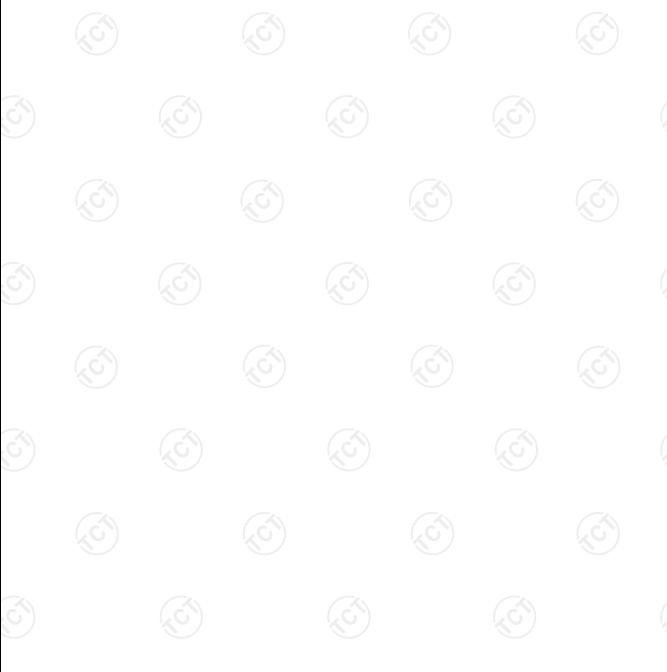
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6.4.3. Test data

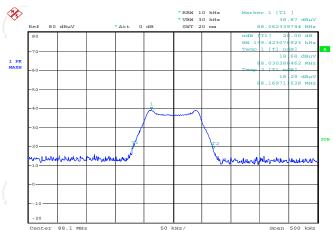
١.					
	Test Channel	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion	
	Lowest	139.42	200	PASS	
	Middle	146.63	200	PASS	
	Highest	142.63	200	PASS	

Test plots as follows:



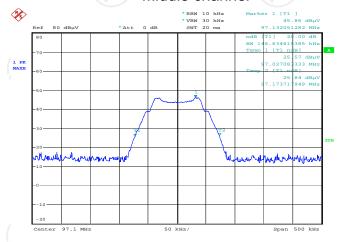


Lowest channel



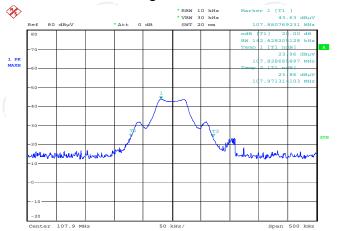
Date: 30.MAR.2016 12:06:31

Middle channel



Date: 30.MAR.2016 12:02:17

Highest channel



Date: 30.MAR.2016 12:03:4

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

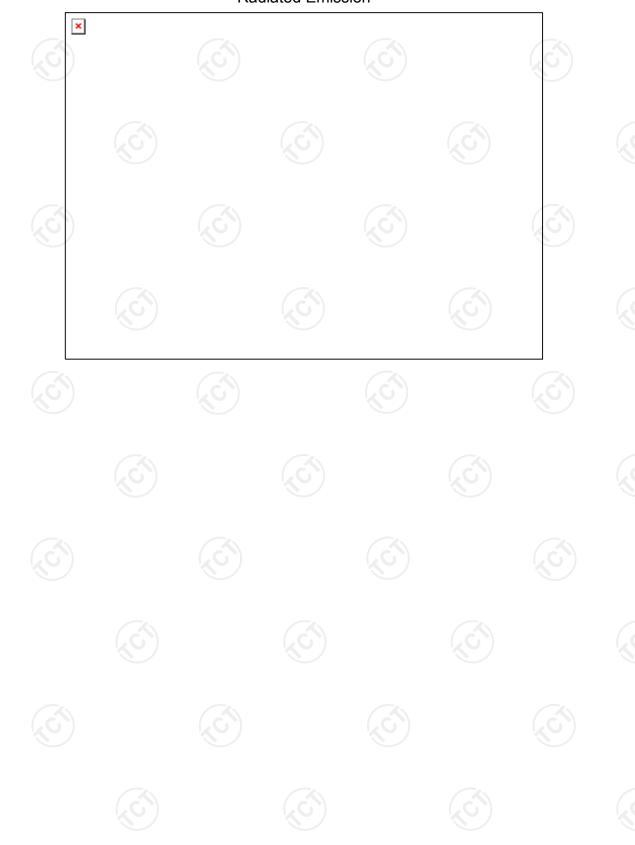


Appendix A: Photographs of Test Setup Product: Bluetooth CAR FM TRANSMITTER

Product: Bluetooth CAR FM TRANSMITTER

Model: FMT-9

Radiated Emission

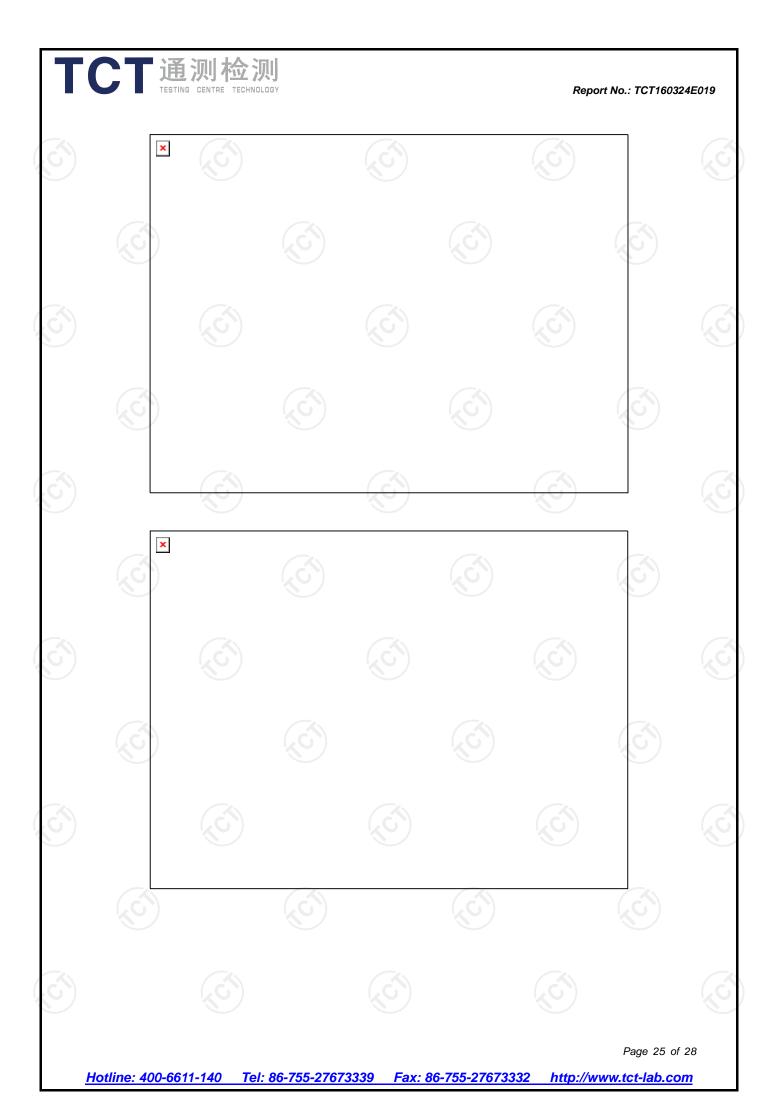




Appendix B: Photographs of EUT Product: Bluetooth CAR FM TRANSMITTER Model: FMT-9 External Photos







「CT通测检测
TESTING CENTRE TECHNOLOGY

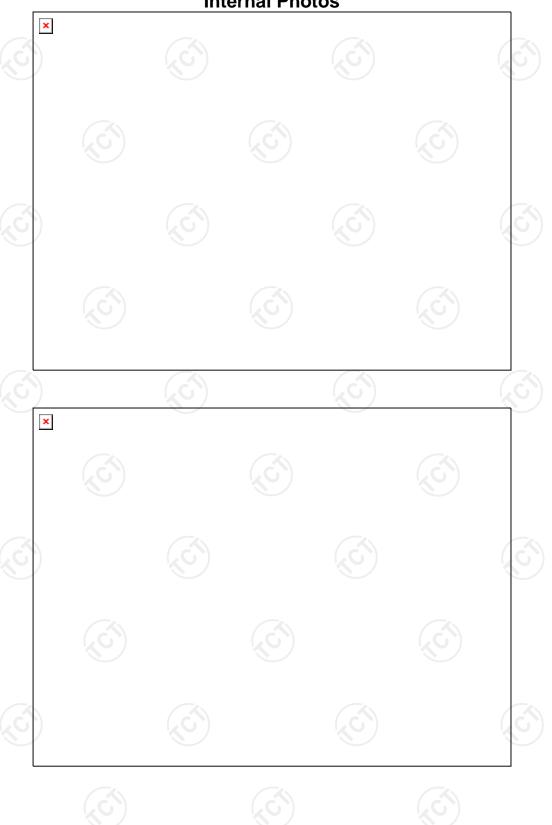
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Product: Bluetooth CAR FM TRANSMITTER Model: FMT-9 Internal Photos



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