

FCC REPORT

Applicant: PORTMAN ELECTRONICS (DONGGUAN) CO., LTD.

Address of Applicant: NO#10, Luyi 2 Road, Keyuancheng, Tangxia Town,
DONGGUAN CITY, GUANGDONG PROVINCE CHINA 523718

Equipment Under Test (EUT)

Product Name: CAR ALARM

Model No.: 553-08

FCC ID: TBQT69-SSI2W

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 18 Jul., 2019

Date of Test: 19 Jul., to 30 Jul., 2019

Date of report issued: 31 Jul., 2019

Test Result: PASS *

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

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	31 Jul., 2019	Original

Tested by:

Carey Chen

Test Engineer

Date:

31 Jul., 2019

Reviewed by:

Winner Zhang

Project Engineer

Date:

31 Jul., 2019

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4 Test Summary

Test Items	Section in CFR 47	Result
Antenna Requirement	15.203 & 15.247 (b)	Pass
Conducted Peak Output Power	15.247 (b)(2)	Pass
20dB Occupied Bandwidth	15.247 (a)(1) (i)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1) (i)	Pass
Dwell Time	15.247 (a)(1) (i)	Pass
Spurious Emission	15.205 & 15.209	Pass
<i>All measurement data were performed in accordance with ANSI C63.10: 2013 and KDB 558074 D01 15.247 Meas Guidance v05r02 of test method.</i>		
<i>Pass: The EUT complies with the essential requirements in the standard.</i>		
<i>N/A: N/A: Not Applicable.</i>		

5 General Information

5.1 Client Information

Applicant:	PORTMAN ELECTRONICS (DONGGUAN) CO., LTD.
Address:	NO#10, Luyi 2 Road, Keyuancheng, Tangxia Town, DONGGUAN CITY, GUANGDONG PROVINCE CHINA 523718
Manufacturer/Factory:	PORTMAN ELECTRONICS (DONGGUAN) CO., LTD.
Address:	NO#10, Luyi 2 Road, Keyuancheng, Tangxia Town, DONGGUAN CITY, GUANGDONG PROVINCE CHINA 523718

5.2 General Description of E.U.T.

Product Name:	CAR ALARM
Model No.:	553-08
Operation Frequency:	905 MHz~925MHz
Number of channel:	25
Modulation type:	FSK
Modulation technology:	FHSS
Antenna Type:	Helix antenna
Antenna gain:	-1.25 dBi
Power supply:	Rechargeable Li-ion polymer Battery DC3.7V/300mAh
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	905.4MHz	7	911.0MHz	14	916.6MHz	21	922.2MHz
1	906.2MHz	8	911.8MHz	15	917.4MHz	22	923.0MHz
2	907.0MHz	9	912.6MHz	16	918.2MHz	23	923.8MHz
3	907.8MHz	10	913.4MHz	17	919.0MHz	24	924.6MHz
4	908.6MHz	11	914.2MHz	18	919.8MHz		
5	909.4MHz	12	915.0MHz	19	920.6MHz		
6	910.2MHz	13	915.8MHz	20	921.4MHz		
Remark: Channel 0, 12 &24 selected as Lowest, Middle and Highest channel							

5.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode with worst case data rate.
Hopping mode:	Keep the EUT in hopping mode.
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 with a fresh battery, 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.	

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.38 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.36 dB (k=2)

5.6 Laboratory Facility

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

● **FCC - Designation No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing 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 L6048.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

5.7 Laboratory Location

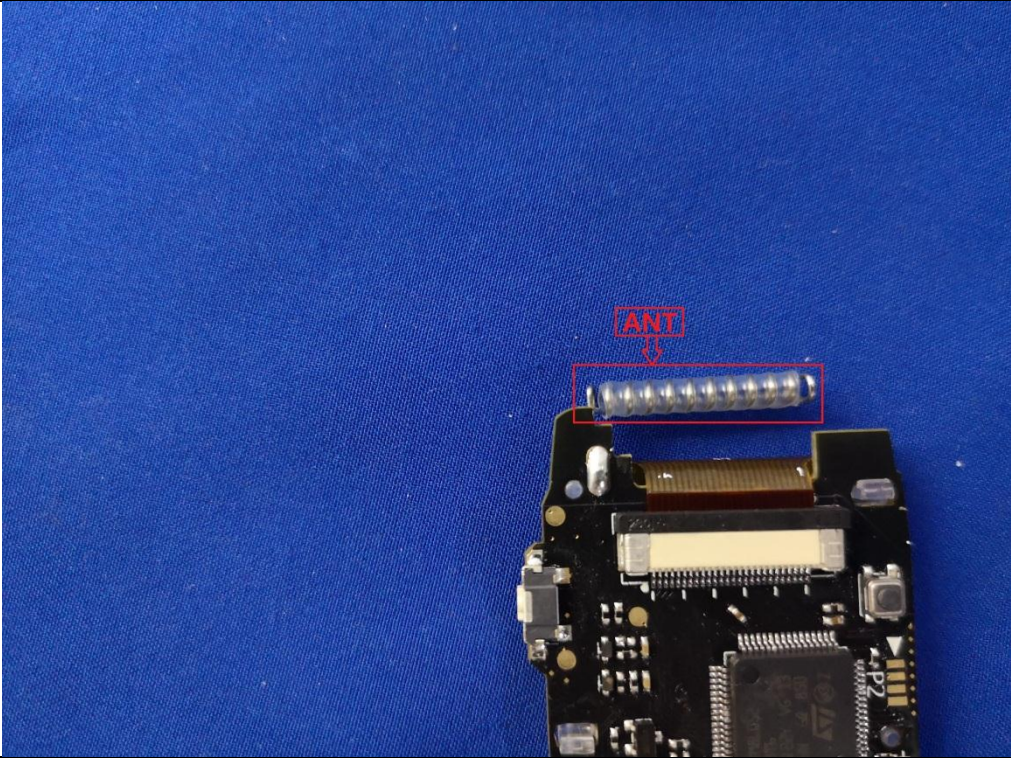
Shenzhen Zhongjian Nanfang Testing Co., Ltd.
 Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
 Bao'an District, Shenzhen, Guangdong, China
 Tel: +86-755-23118282, Fax: +86-755-23116366
 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.8 Test Instruments list

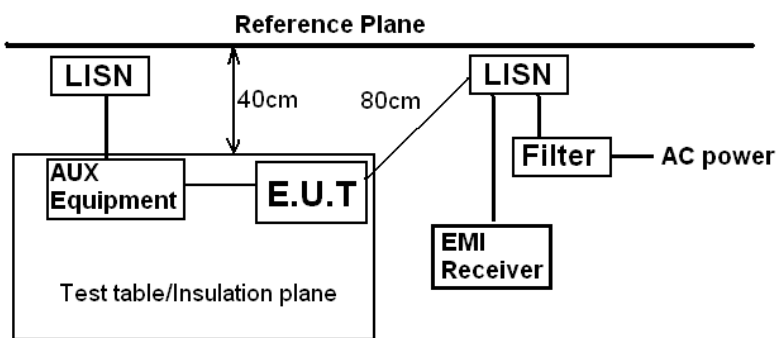
Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-18-2019	03-17-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
RF Switch Unit	MWRFTTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTTEST	MTS8200	Version: 2.0.0.0		

6 Test results and measurement data

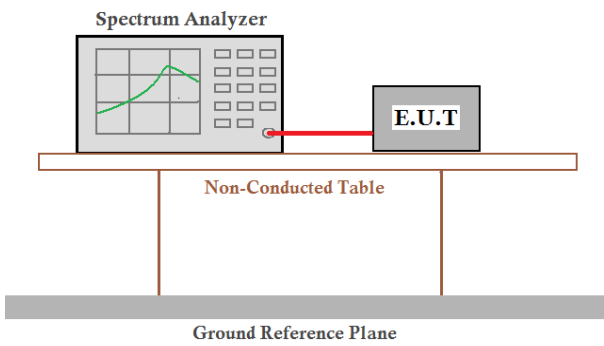
6.1 Antenna Requirement

Standard requirement:	FCC Part 15 C Section 15.203 & 247(b)
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(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The antenna is an Helix antenna which permanently attached, and the best case gain of the antenna is 0 dBi.	
	

6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.207		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test procedure	- The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which 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 setup:	 <i>Remark</i> <i>E.U.T: Equipment Under Test</i> <i>LISN: Line Impedance Stabilization Network</i> <i>Test table height=0.8m</i>		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed (EUT power is supplied by DC 3.7 battery, EUT cannot be transmitted when EUT is charging)		

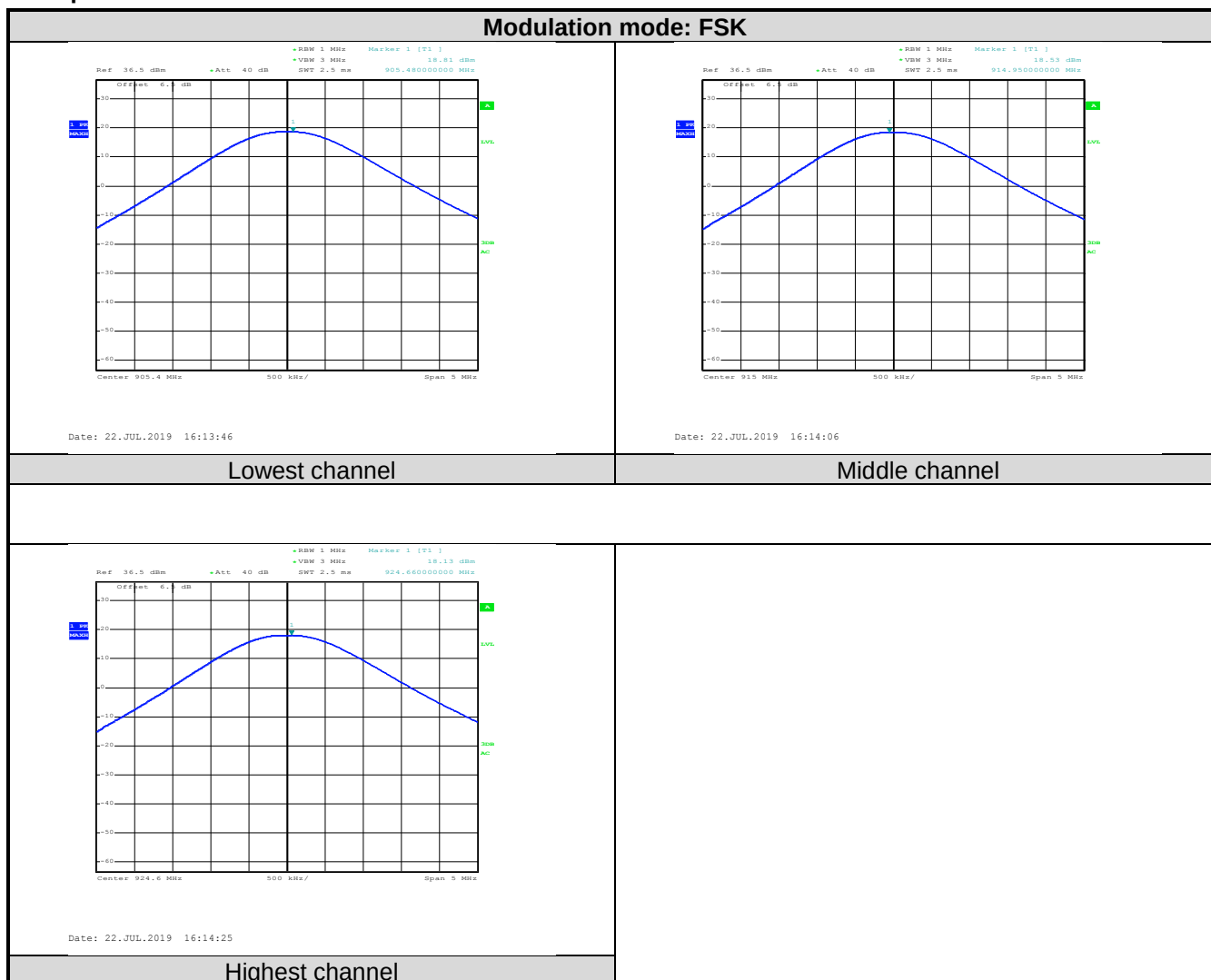
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(2)
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak
Limit:	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass

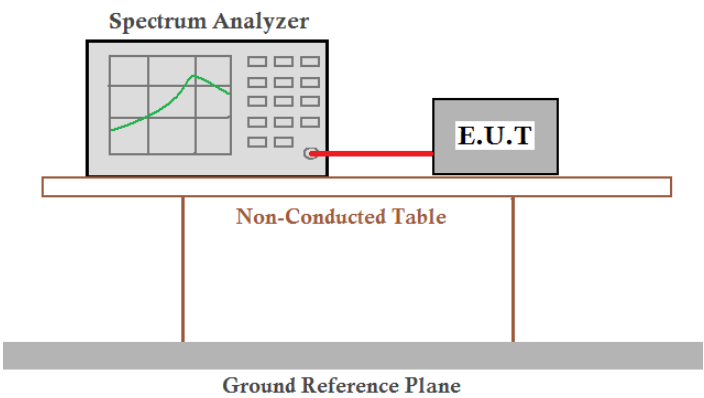
Measurement Data:

Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest channel	18.81	24.00	Pass
Middle channel	18.53	24.00	Pass
Highest channel	18.13	24.00	Pass

Test plot as follows:



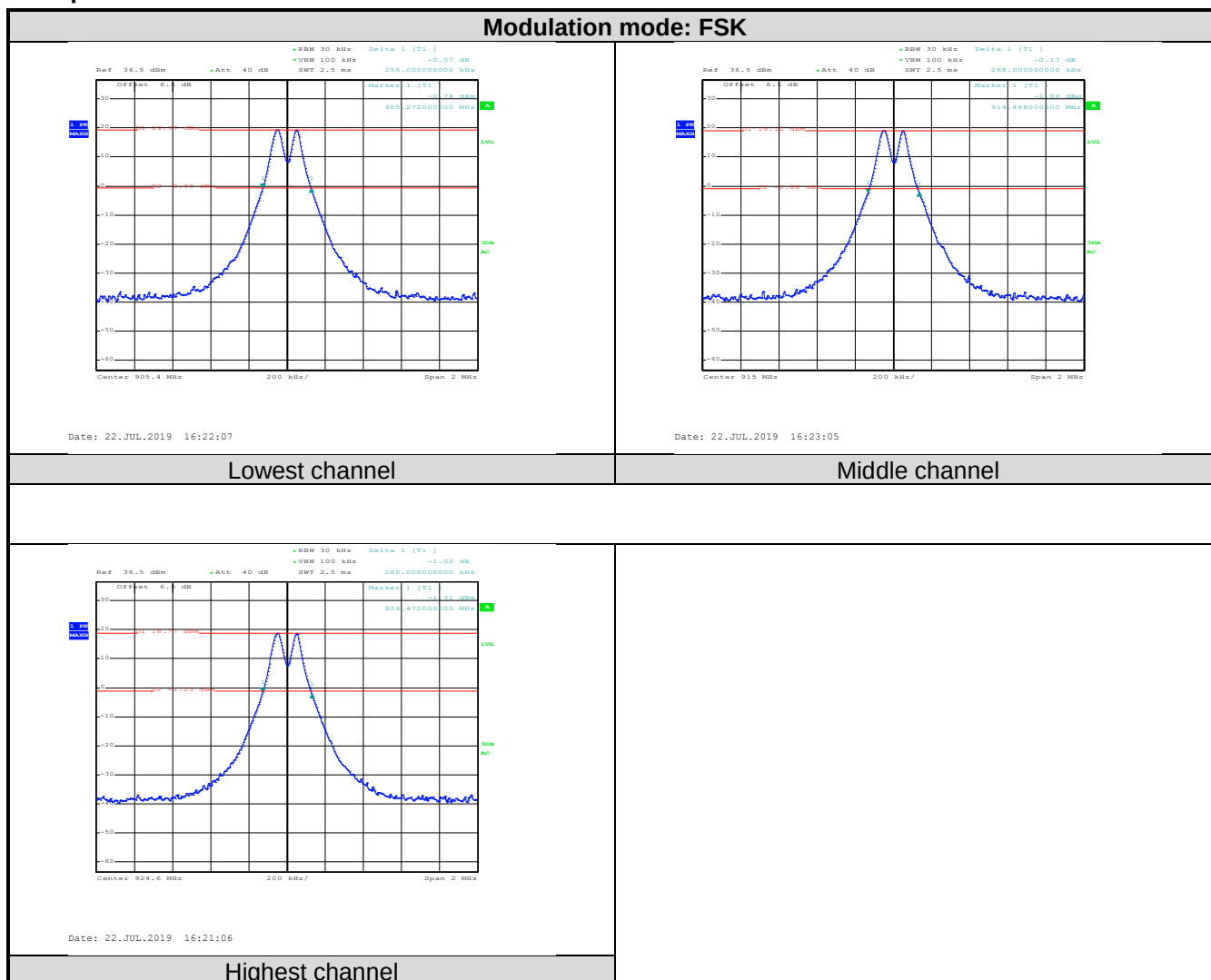
6.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
Limit:	250KHz < 20dB < 500KHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass

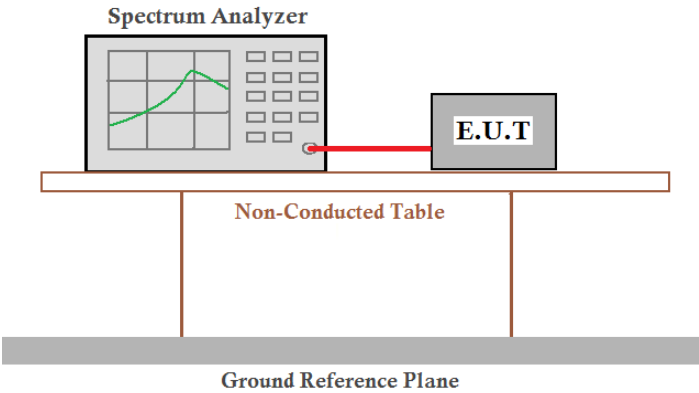
Measurement Data:

Test channel	20dB Occupy Bandwidth (kHz)			
	Lowest	Middle	Highest	Result
	256	268	260	PASS

Test plot as follows:



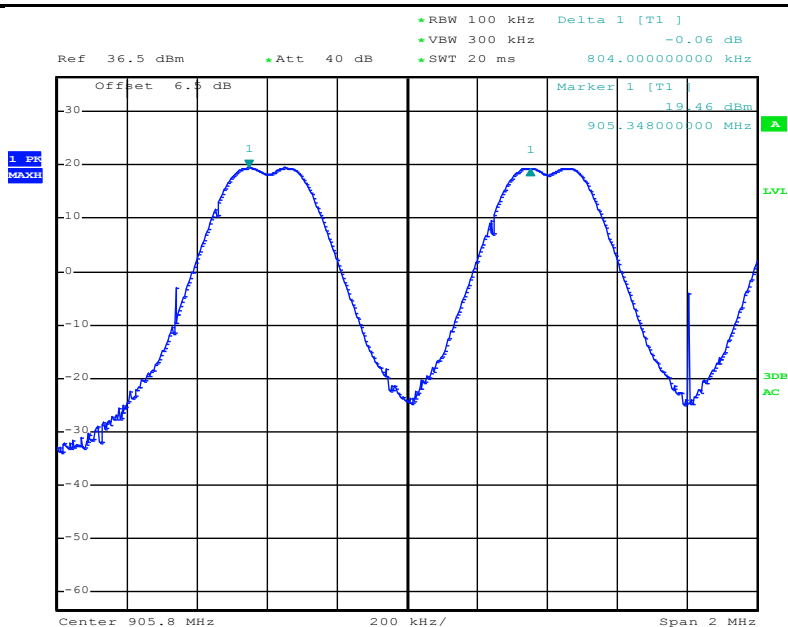
6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, detector=Peak
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data

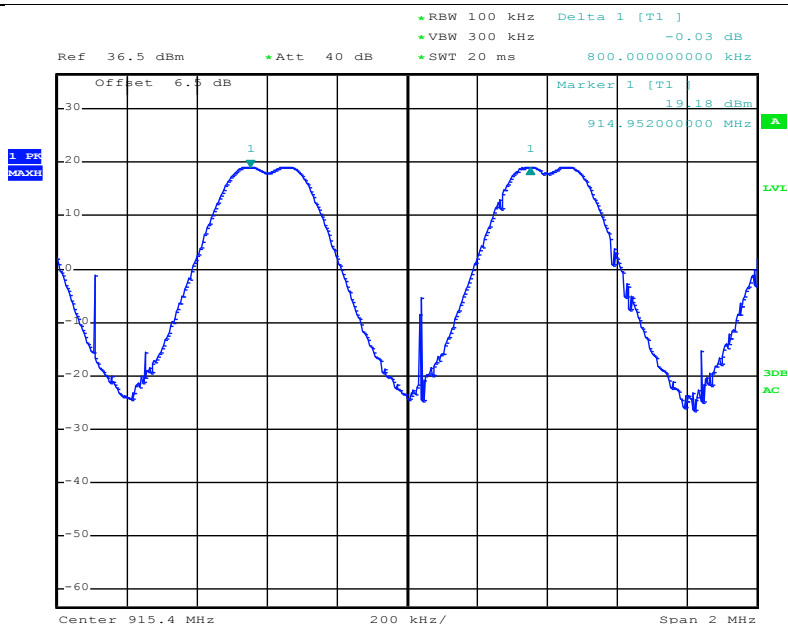
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
FSK			
Lowest	804	264	Pass
Middle	800	264	Pass
Highest	800	264	Pass

Test plot as follows:



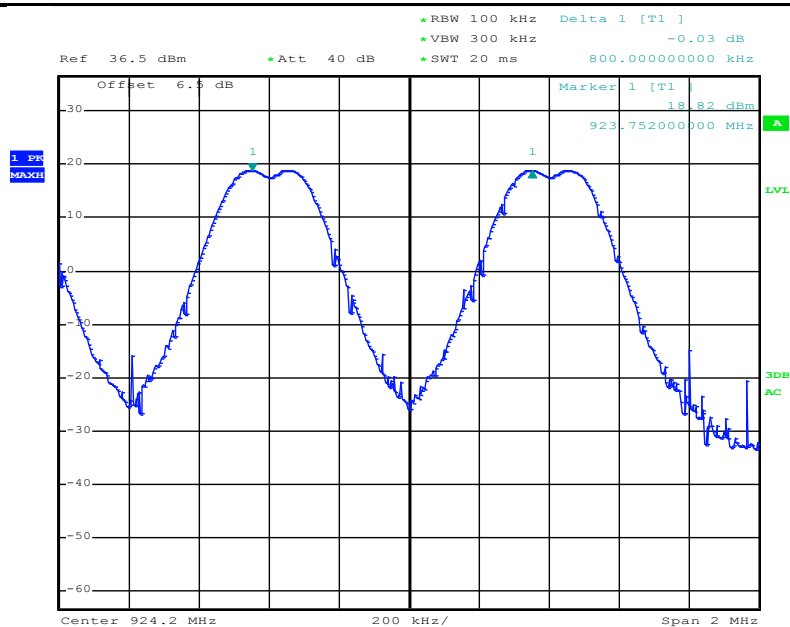
Date: 8.AUG.2019 17:20:35

Lowest channel



Date: 8.AUG.2019 17:22:14

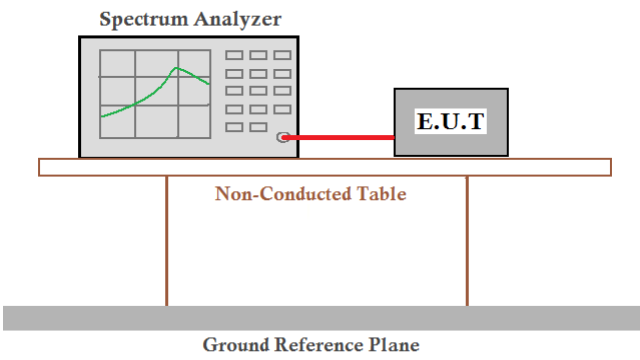
Middle channel



Date: 8.AUG.2019 17:24:54

Highest channel

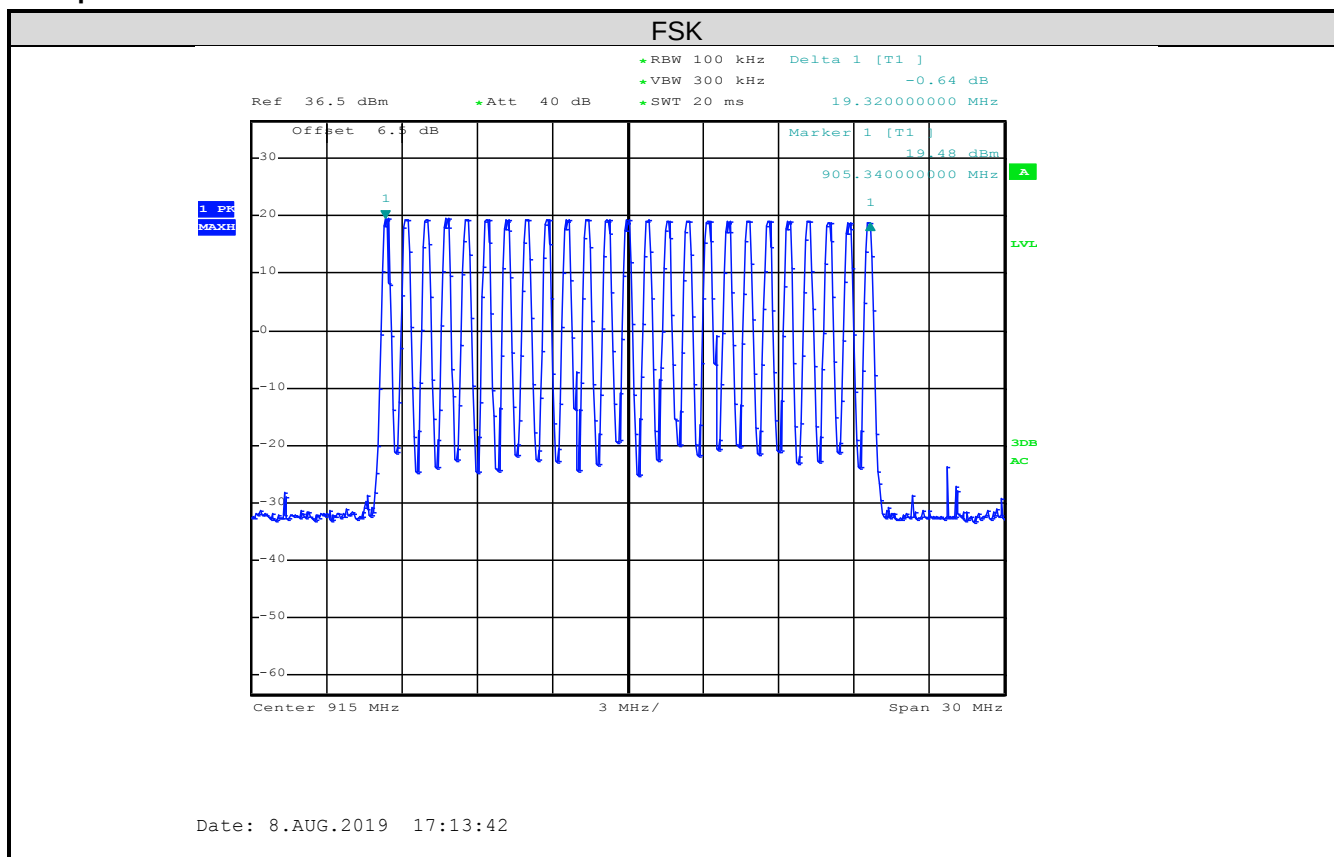
6.6 Hopping Channel Number

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	25 channels
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Hopping mode
Test results:	Pass

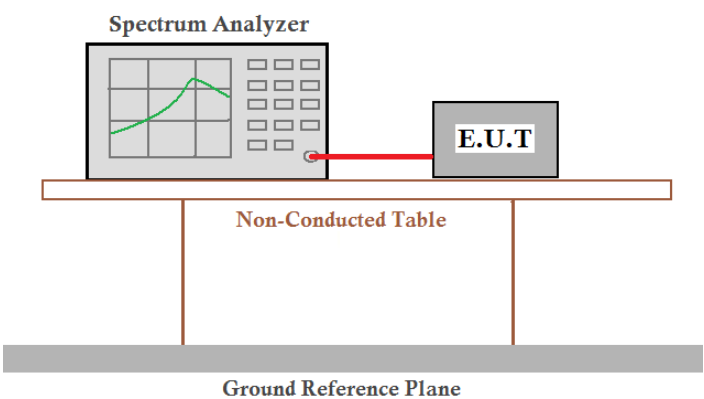
Measurement Data:

Mode	Hopping channel numbers	Limit	Result
FSK	25	25	Pass

Test plot as follows:



6.7 Dwell Time

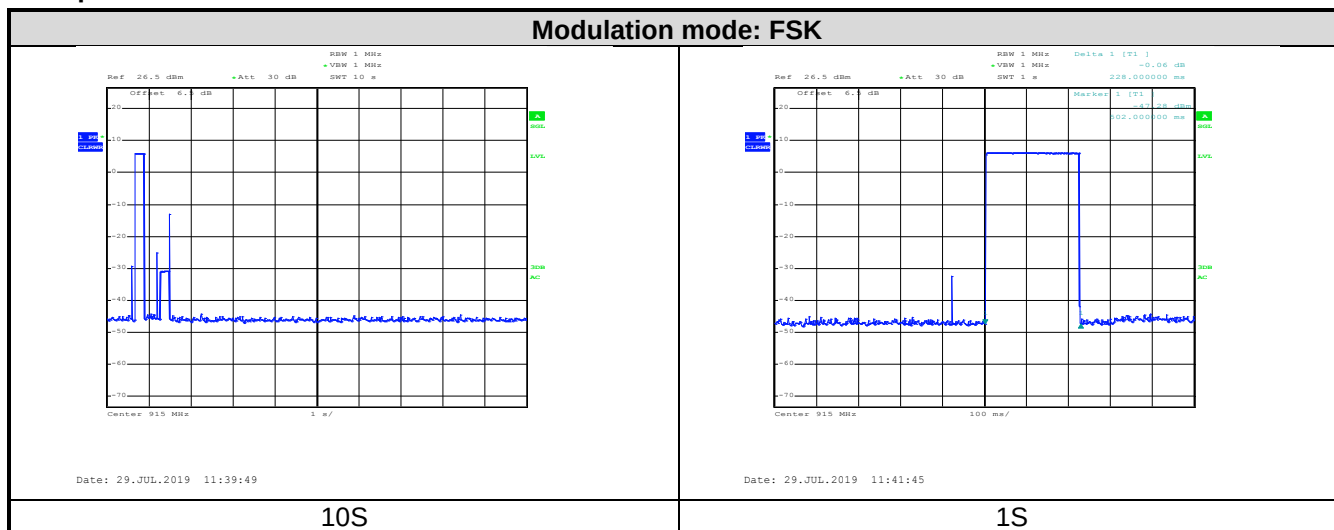
Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak
Limit:	Occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data:

Mode	10 second period (numbers)	Dwell time (second)	Limit (second)	Result
FSK	1	0.228	0.4	Pass

Note:
Calculation Formula: Dwell time = Ton time per hop * Hopping numbers
For example:
Time slot=0.228*1 =0.228ms

Test plot as follows:

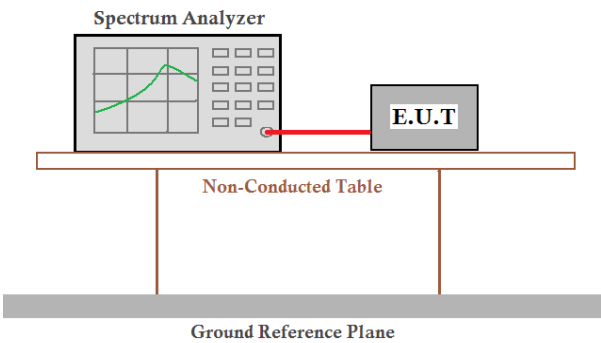


6.8 Pseudorandom Frequency Hopping Sequence

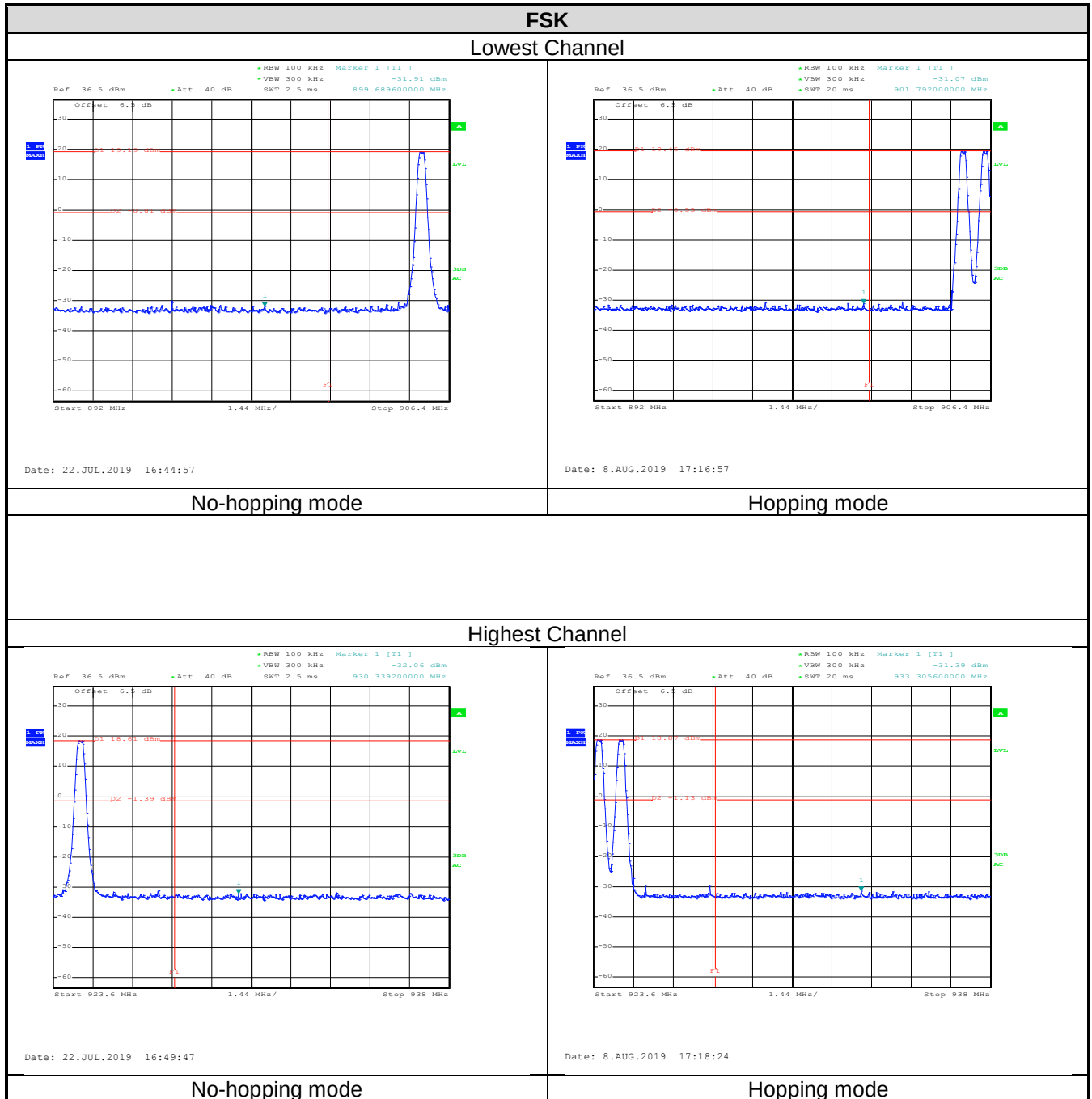
Test Requirement:	FCC Part 15 C Section 15.247 (a)(1) requirement:
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.	
EUT Pseudorandom Frequency Hopping Sequence	
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones. • Number of shift register stages: 9 • Length of pseudo-random sequence: $2^9 - 1 = 511$ bits • Longest sequence of zeros: 8 (non-inverted signal) <i>Linear Feedback Shift Register for Generation of the PRBS sequence</i> An example of Pseudorandom Frequency Hopping Sequence as follow: Each frequency used equally on the average by each transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.	

6.9 Band Edge

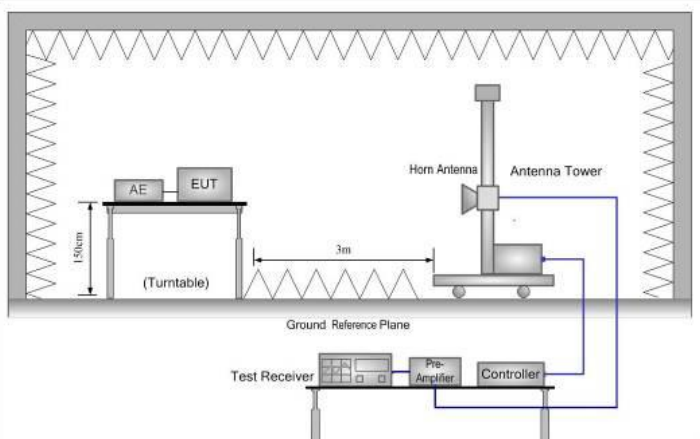
6.9.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T (Equipment Under Test). Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode and hopping mode
Test results:	Pass

Test plot as follows:

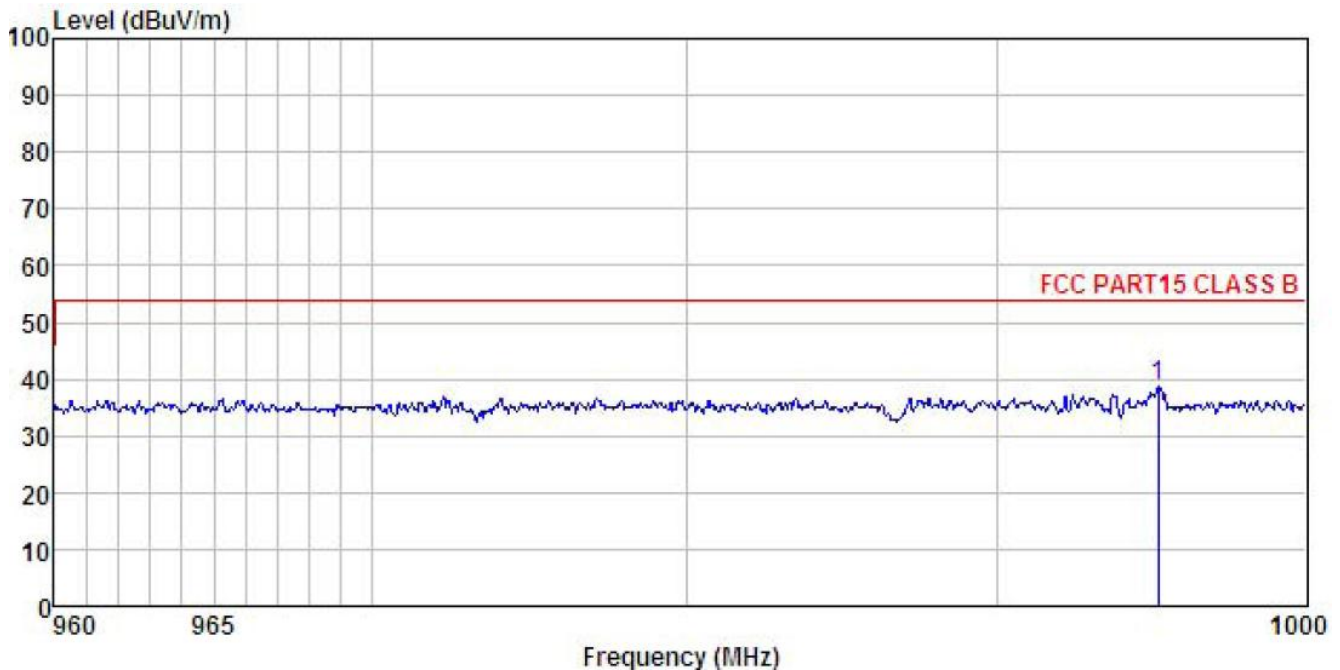


6.9.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Frequency Range:	960MHz to1240MHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test setup:					
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. 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.				
Test Instruments:	Refer to section 5.8 for details				
Test mode:	Non-hopping mode				
Test results:	Passed				

Below 1GHz:

Product Name:	CAR ALARM	Product Model:	553-08
Test By:	Carey	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 3.7V	Environment:	Temp: 24°C Humi: 57%

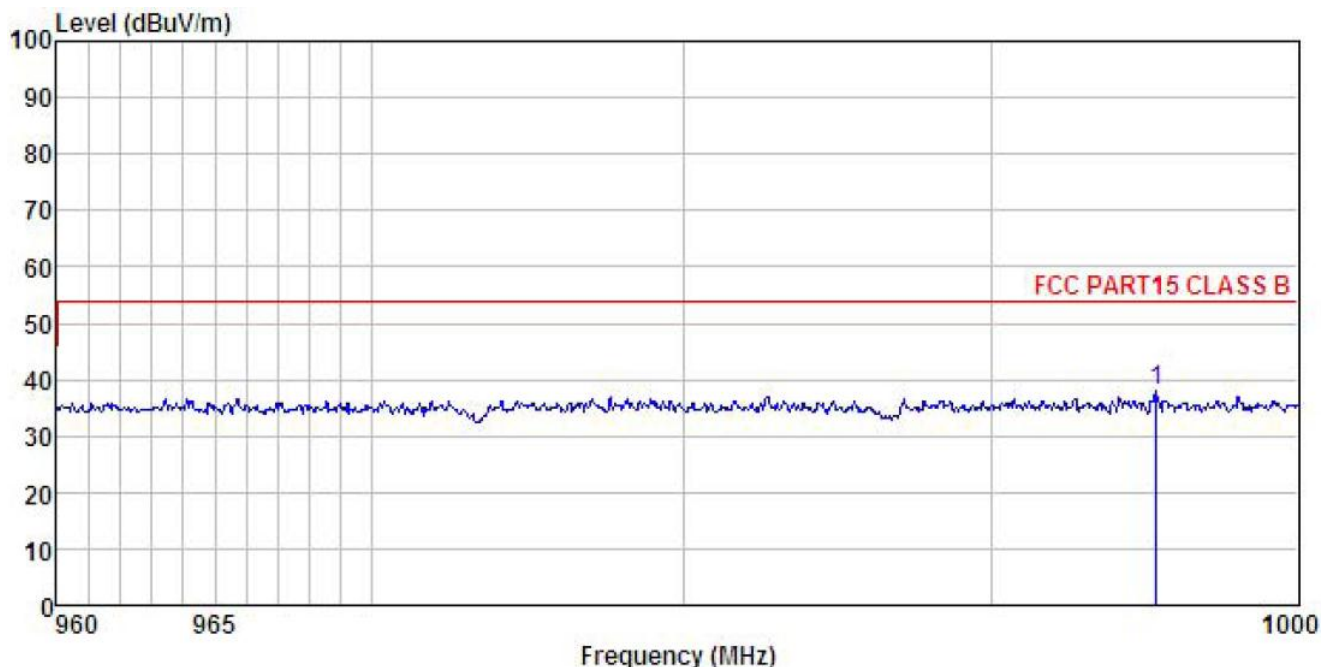


	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	995.195	11.46	22.79	4.44	0.00	38.69	54.00	-15.31 QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	CAR ALARM	Product Model:	553-08
Test By:	Carey	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 3.7V	Environment:	Temp: 24°C Humi: 57%



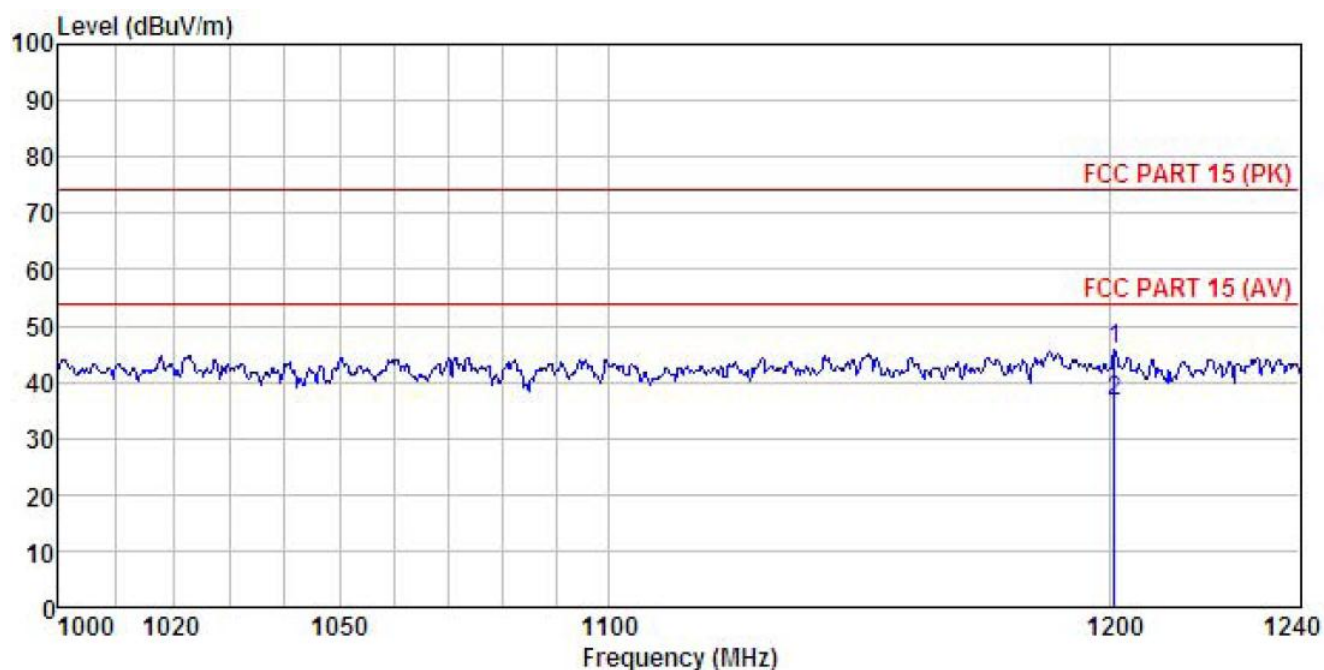
	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	995.357	10.66	22.79	4.44	0.00	37.89	54.00	-16.11

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz:

Product Name:	CAR ALARM	Product Model:	553-08
Test By:	Carey	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 3.7V	Environment:	Temp: 24℃ Humi: 57%

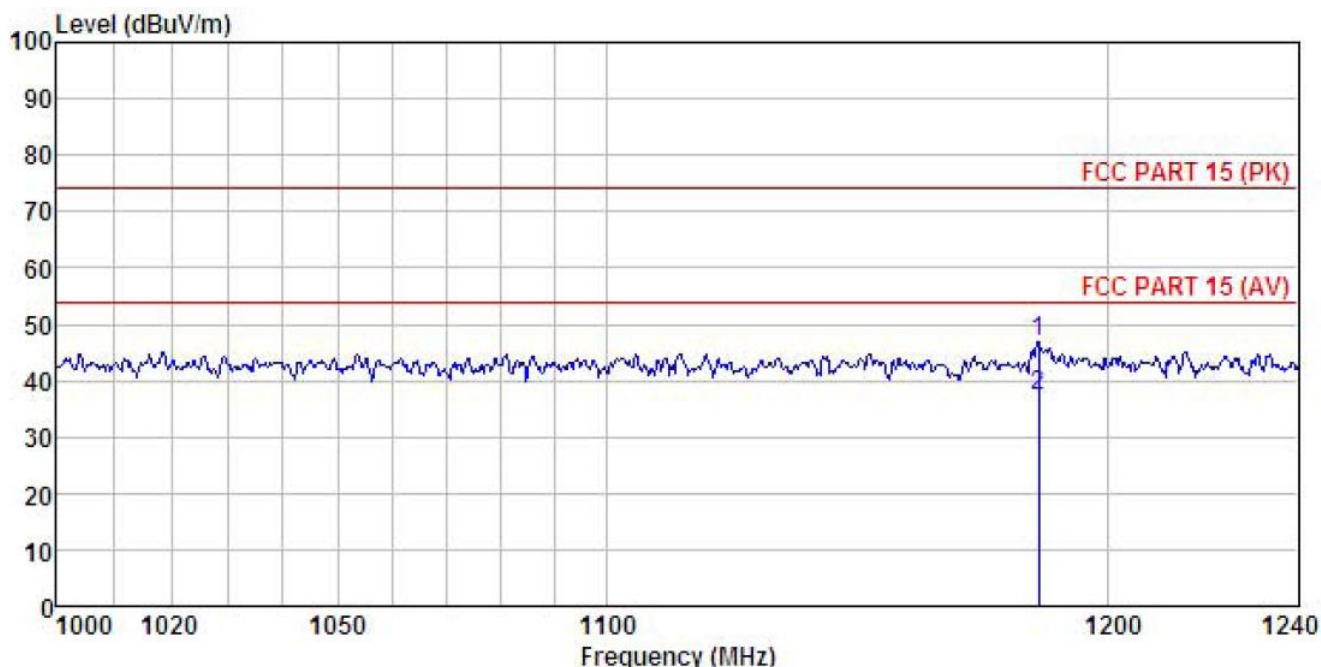


	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 1200.886	17.78	24.60	3.31	0.00	45.69	74.00	-28.31	Peak
2 1200.886	8.72	24.60	3.31	0.00	36.63	54.00	-17.37	Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	CAR ALARM	Product Model:	553-08
Test By:	Carey	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 3.7V	Environment:	Temp: 24°C Humi: 57%



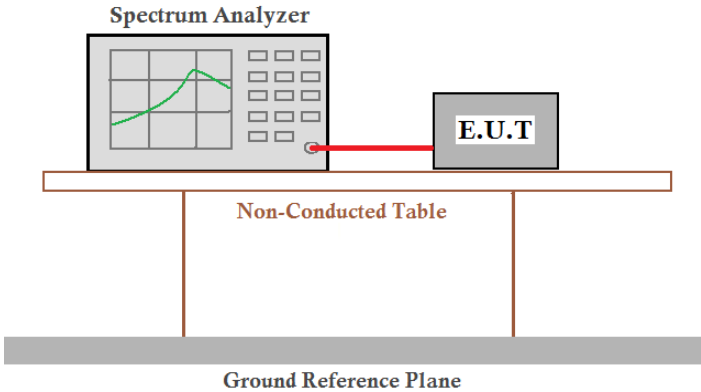
	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1185.486	19.05	24.58	3.29	0.00	46.92	74.00	-27.08 Peak
2	1185.486	9.26	24.58	3.29	0.00	37.13	54.00	-16.87 Average

Remark:

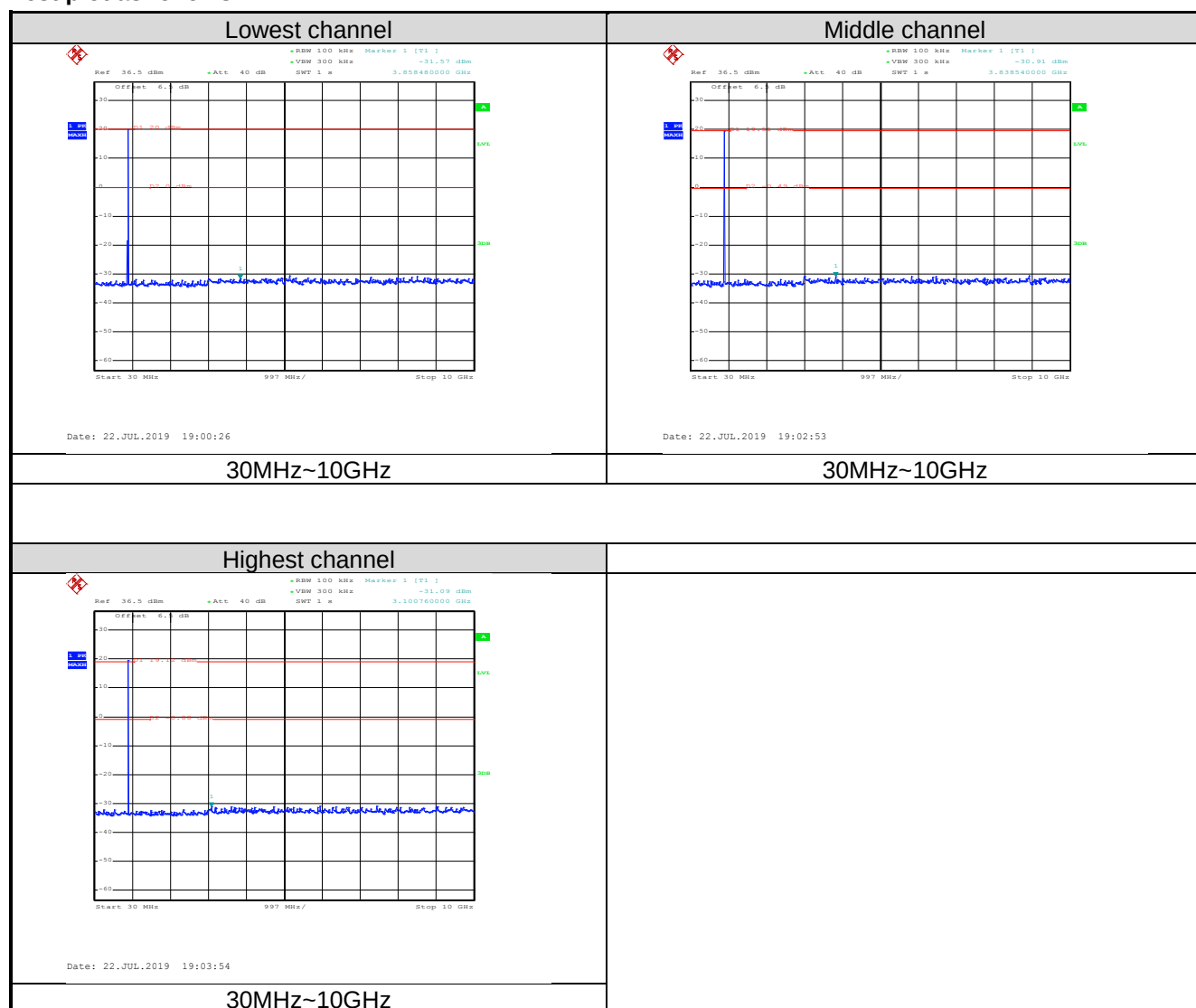
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

6.10 Spurious Emission

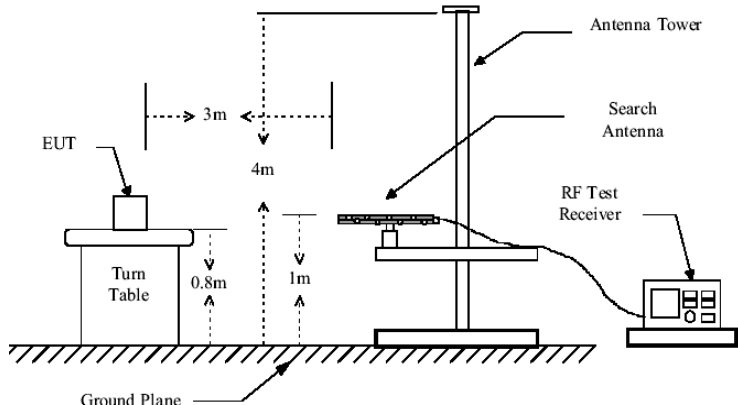
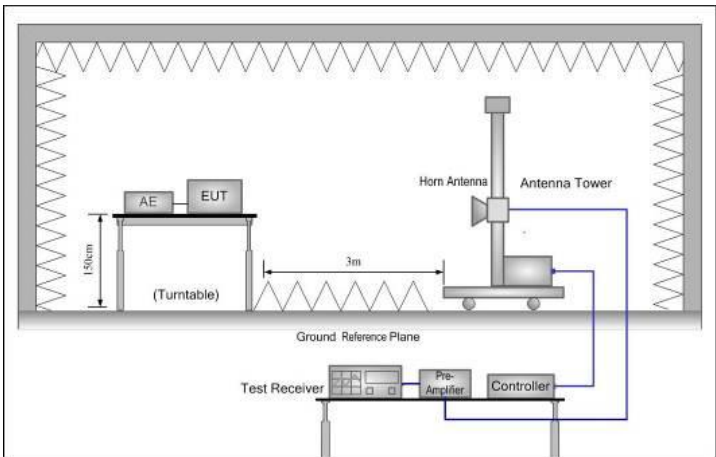
6.10.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and DA00-705
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T (Equipment Under Test). Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass

Test plot as follows:



6.10.2 Radiated Emission Method

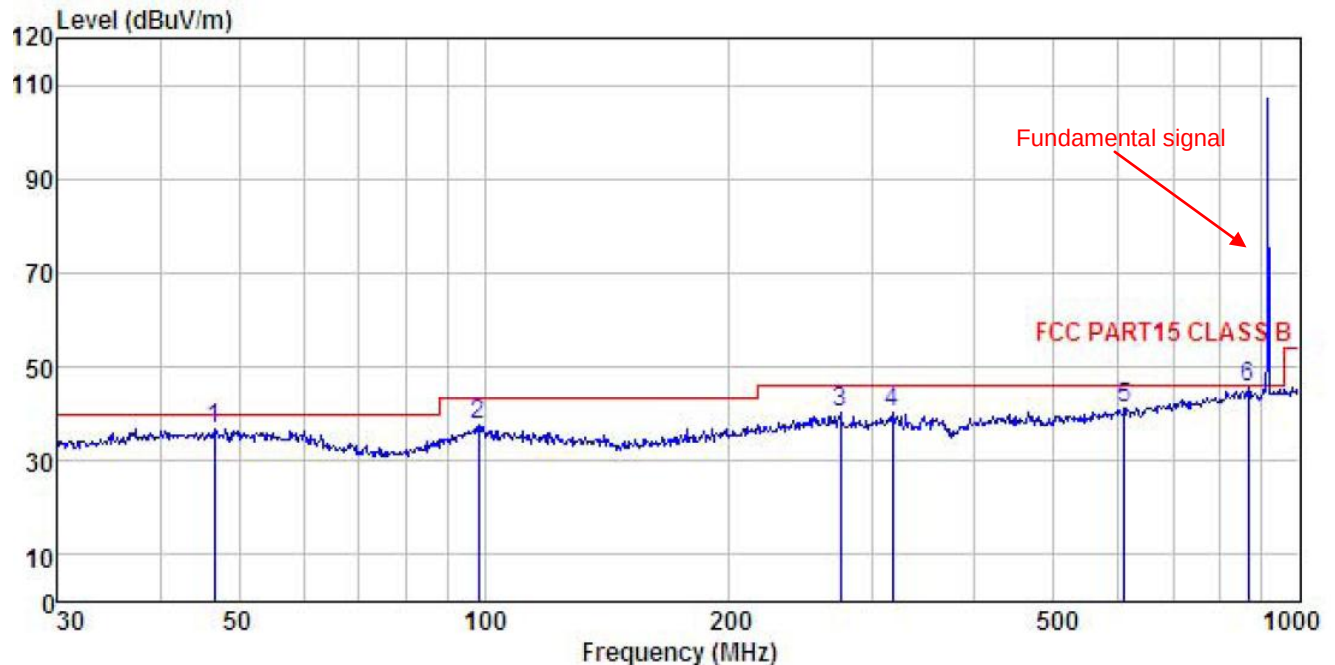
Test Requirement:	FCC Part 15 C Section 15.209				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	9 kHz to 10 GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz	54.0		Average Value	
74.0		Peak Value			
Test setup:	Below 1GHz				
					
	Above 1GHz				
					
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table				

	was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. 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.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	CAR ALARM	Product Model:	553-08
Test By:	Carey	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3.7V	Environment:	Temp: 24℃ Humi: 57%

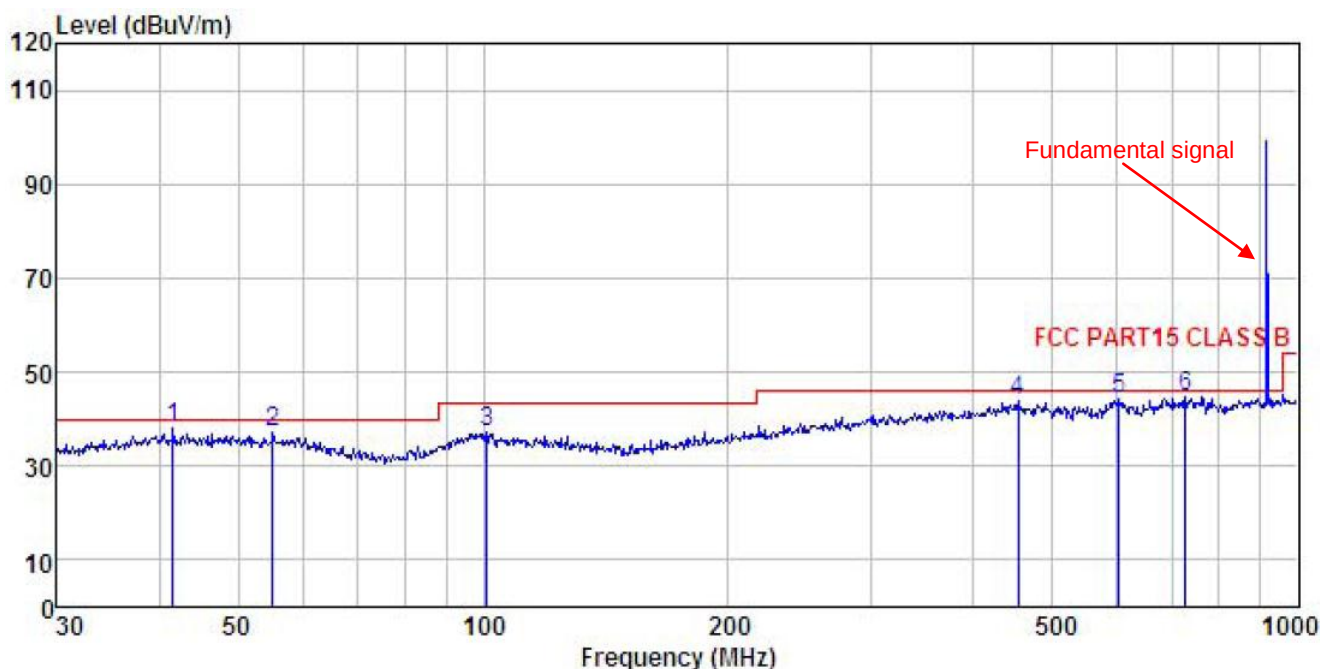


	Freq	ReadAntenna	Cable Preamp	Limit	Over				
		Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	46.666	23.36	12.24	1.28	0.00	36.88	40.00	-3.12	QP
2	98.487	23.50	12.13	1.97	0.00	37.60	43.50	-5.90	QP
3	273.234	24.07	13.14	2.87	0.00	40.08	46.00	-5.92	QP
4	316.589	23.52	13.95	2.99	0.00	40.46	46.00	-5.54	QP
5	609.922	17.93	19.54	3.92	0.00	41.39	46.00	-4.61	QP
6	866.088	18.88	22.56	4.04	0.00	45.48	46.00	-0.52	QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	CAR ALARM	Product Model:	553-08
Test By:	Carey	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3.7V	Environment:	Temp: 24℃ Humi: 57%



	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	41.567	24.28	12.37	1.24	0.00	37.89	40.00	-2.11 QP
2	55.221	24.15	11.59	1.36	0.00	37.10	40.00	-2.90 QP
3	100.934	22.89	12.43	1.95	0.00	37.27	43.50	-6.23 QP
4	452.720	23.90	16.57	3.22	0.00	43.69	46.00	-2.31 QP
5	603.539	20.65	19.52	3.94	0.00	44.11	46.00	-1.89 QP
6	726.805	19.99	20.51	4.28	0.00	44.78	46.00	-1.22 QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz:

Test channel: Lowest channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1810.80	37.26	25.99	4.13	2.37	41.24	28.51	74.00	-45.49	Vertical
2716.20	41.61	28.06	5.06	2.87	41.75	35.85	74.00	-38.15	Vertical
3621.60	59.06	29.23	5.91	2.97	41.57	55.60	74.00	-18.40	Vertical
4527.00	55.20	31.15	6.84	3.54	42.08	54.65	74.00	-19.35	Vertical
5432.40	51.62	32.34	7.16	3.89	41.85	53.16	74.00	-20.84	Vertical
6337.80	49.27	34.12	8.19	4.63	41.94	54.27	74.00	-19.73	Vertical
1810.80	37.16	25.99	4.13	2.37	41.24	28.41	74.00	-45.59	Horizontal
2716.20	41.24	28.06	5.06	2.87	41.75	35.48	74.00	-38.52	Horizontal
3621.60	64.54	29.23	5.91	2.97	41.57	61.08	74.00	-12.92	Horizontal
4527.00	56.58	31.15	6.84	3.54	42.08	56.03	74.00	-17.97	Horizontal
5432.40	55.11	32.34	7.16	3.89	41.85	56.65	74.00	-17.35	Horizontal
6337.80	48.97	34.12	8.19	4.63	41.94	53.97	74.00	-20.03	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1810.80	34.42	25.99	4.13	2.37	41.24	25.67	54.00	-28.33	Vertical
2716.20	37.47	28.06	5.06	2.87	41.75	31.71	54.00	-22.29	Vertical
3621.60	51.85	29.23	5.91	2.97	41.57	48.39	54.00	-5.61	Vertical
4527.00	47.49	31.15	6.84	3.54	42.08	46.94	54.00	-7.06	Vertical
5432.40	43.81	32.34	7.16	3.89	41.85	45.35	54.00	-8.65	Vertical
6337.80	41.42	34.12	8.19	4.63	41.94	46.42	54.00	-7.58	Vertical
1810.80	34.19	25.99	4.13	2.37	41.24	25.44	54.00	-28.56	Horizontal
2716.20	37.83	28.06	5.06	2.87	41.75	32.07	54.00	-21.93	Horizontal
3621.60	54.19	29.23	5.91	2.97	41.57	50.73	54.00	-3.27	Horizontal
4527.00	48.61	31.15	6.84	3.54	42.08	48.06	54.00	-5.94	Horizontal
5432.40	47.88	32.34	7.16	3.89	41.85	49.42	54.00	-4.58	Horizontal
6337.80	40.09	34.12	8.19	4.63	41.94	45.09	54.00	-8.91	Horizontal
Remark:									
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.									
2. The emission levels of other frequencies are very lower than the limit and not show in test report.									

Test channel: Middle channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1830.00	37.07	26.03	4.15	2.40	41.27	28.38	74.00	-45.62	Vertical
2745.00	41.16	28.11	5.08	2.88	41.72	35.51	74.00	-38.49	Vertical
3660.00	59.65	29.35	5.95	2.97	41.62	56.30	74.00	-17.70	Vertical
4575.00	53.03	31.24	6.89	3.47	42.13	52.50	74.00	-21.50	Vertical
5490.00	51.68	32.40	7.22	3.92	41.83	53.39	74.00	-20.61	Vertical
6405.00	49.40	34.26	8.23	4.76	41.92	54.73	74.00	-19.27	Vertical
1830.00	37.16	26.03	4.15	2.40	41.27	28.47	74.00	-45.53	Horizontal
2745.00	41.59	28.11	5.08	2.88	41.72	35.94	74.00	-38.06	Horizontal
3660.00	63.79	29.35	5.95	2.97	41.62	60.44	74.00	-13.56	Horizontal
4575.00	56.77	31.24	6.89	3.47	42.13	56.24	74.00	-17.76	Horizontal
5490.00	49.44	32.40	7.22	3.92	41.83	51.15	74.00	-22.85	Horizontal
6405.00	49.03	34.26	8.23	4.76	41.92	54.36	74.00	-19.64	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1830.00	34.16	26.03	4.15	2.40	41.27	25.47	54.00	-28.53	Vertical
2745.00	37.42	28.11	5.08	2.88	41.72	31.77	54.00	-22.23	Vertical
3660.00	51.61	29.35	5.95	2.97	41.62	48.26	54.00	-5.74	Vertical
4575.00	45.91	31.24	6.89	3.47	42.13	45.38	54.00	-8.62	Vertical
5490.00	43.42	32.40	7.22	3.92	41.83	45.13	54.00	-8.87	Vertical
6405.00	41.32	34.26	8.23	4.76	41.92	46.65	54.00	-7.35	Vertical
1830.00	34.27	26.03	4.15	2.40	41.27	25.58	54.00	-28.42	Horizontal
2745.00	37.68	28.11	5.08	2.88	41.72	32.03	54.00	-21.97	Horizontal
3660.00	54.28	29.35	5.95	2.97	41.62	50.93	54.00	-3.07	Horizontal
4575.00	48.49	31.24	6.89	3.47	42.13	47.96	54.00	-6.04	Horizontal
5490.00	41.65	32.40	7.22	3.92	41.83	43.36	54.00	-10.64	Horizontal
6405.00	41.27	34.26	8.23	4.76	41.92	46.60	54.00	-7.40	Horizontal
Remark:									
3. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.									
4. The emission levels of other frequencies are very lower than the limit and not show in test report.									

Test channel: Highest channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1849.20	37.21	26.07	4.17	2.41	41.32	28.54	74.00	-45.46	Vertical
2773.80	41.15	28.17	5.11	2.88	41.69	35.62	74.00	-38.38	Vertical
3698.40	61.65	29.44	5.98	2.97	41.66	58.38	74.00	-15.62	Vertical
4623.00	53.03	31.31	6.89	3.57	42.10	52.70	74.00	-21.30	Vertical
5547.60	51.68	32.49	7.26	3.91	41.81	53.53	74.00	-20.47	Vertical
6472.20	50.92	34.43	8.28	4.76	41.90	56.49	74.00	-17.51	Vertical
1849.20	37.58	26.07	4.17	2.41	41.32	28.91	74.00	-45.09	Horizontal
2773.80	41.41	28.17	5.11	2.88	41.69	35.88	74.00	-38.12	Horizontal
3698.40	63.23	29.44	5.98	2.97	41.66	59.96	74.00	-14.04	Horizontal
4623.00	56.73	31.31	6.89	3.57	42.10	56.40	74.00	-17.60	Horizontal
5547.60	55.66	32.49	7.26	3.91	41.81	57.51	74.00	-16.49	Horizontal
6472.20	49.58	34.43	8.28	4.76	41.90	55.15	74.00	-18.85	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1849.20	34.52	26.07	4.17	2.41	41.32	25.85	54.00	-28.15	Vertical
2773.80	37.31	28.17	5.11	2.88	41.69	31.78	54.00	-22.22	Vertical
3698.40	53.81	29.44	5.98	2.97	41.66	50.54	54.00	-3.46	Vertical
4623.00	45.36	31.31	6.89	3.57	42.10	45.03	54.00	-8.97	Vertical
5547.60	43.25	32.49	7.26	3.91	41.81	45.10	54.00	-8.90	Vertical
6472.20	42.94	34.43	8.28	4.76	41.90	48.51	54.00	-5.49	Vertical
1849.20	34.12	26.07	4.17	2.41	41.32	25.45	54.00	-28.55	Horizontal
2773.80	37.42	28.17	5.11	2.88	41.69	31.89	54.00	-22.11	Horizontal
3698.40	54.26	29.44	5.98	2.97	41.66	50.99	54.00	-3.01	Horizontal
4623.00	48.03	31.31	6.89	3.57	42.10	47.70	54.00	-6.30	Horizontal
5547.60	47.95	32.49	7.26	3.91	41.81	49.80	54.00	-4.20	Horizontal
6472.20	41.92	34.43	8.28	4.76	41.90	47.49	54.00	-6.51	Horizontal
Remark:									
5. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.									
6. The emission levels of other frequencies are very lower than the limit and not show in test report.									