FCC Test Report

Product Name	Car Radio with BT
Model No.	BTS33
FCC ID.	2ABGYBTS33-CLARION

Applicant	Electronica Clarion S.A. de C.V.
Address	Av. 3 y esq. Calle 9 S/N, Zona Industrial, San Juan del Rio, Queretaro, Mexico

Date of Receipt	Nov. 12, 2013
Issued Date	Nov. 27, 2013
Report No.	13B0241R-RFUSP01V00
Report Version	V1.0



The Test Results relate only to the samples tested.

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Test Report Certification

Issued Date: Nov. 27, 2013 Report No.: 13B0241R-RFUSP01V00



Product Name	Car Radio with BT		
Applicant	Electronica Clarion S.A. de C.V.		
Address	Av. 3 y esq. Calle 9 S/N, Zona Industrial, San Juan del Rio, Queretaro, Mexico		
Manufacturer	Electronica Clarion S.A. de C.V.		
Model No.	BTS33		
FCC ID.	2ABGYBTS33-CLARION		
EUT Rated Voltage	DC 12V		
EUT Test Voltage	AC 120V/ 60Hz		
Trade Name	clarion		
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012		
	ANSI C63.4: 2003, ANSI C63.10: 2009		
Test Result	Complied		

The Test Results relate only to the samples tested.

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Documented By

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(Senior Engineering Adm. Specialist /

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Tested By

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Approved By

(Director / Vincent Lin)

TABLE OF CONTENTS

Des	cription	Page
1.	GENERAL INFORMATION	5
1.1.	EUT Description	5
12	Operational Description	
1.3.	Tested System Details	
1.4.	Configuration of Tested System	8
1.5.	EUT Exercise Software	8
1.6.	Test Facility	
2.	CONDUCTED EMISSION	
2.1.	Togt Equipment	IU 10
2.1.	Test Equipment	
	Test Setup	
2.3.	Limits	
2.4.	Test Procedure	
2.5.	Uncertainty	
2.6.	Test Result of Conducted Emission	
3.	PEAK POWER OUTPUT	
3.1.	Test Equipment	
3.2.	Test Setup	
3.3.	Limit	
3.4.	Test Procedure	
3.5.	Uncertainty	
3.6.	Test Result of Peak Power Output	14
4.	RADIATED EMISSION	
4.1.	Test Equipment	
4.2.	Test Setup	
4.3.	Limits	
4.4.	Test Procedure	
4.5.	Uncertainty	18
4.6.	Test Result of Radiated Emission	10
5.	RF ANTENNA CONDUCTED TEST	
5.1.		
5.2.	Test Equipment	
	Test Setup	
5.3.	Limits	
5.4.	Test Procedure	
5.5.	Uncertainty	
5.6.	Test Result of RF Antenna Conducted Test	
6.	BAND EDGE	
6.1.	Test Equipment	
6.2.	Test Setup	
6.3.	Limit	
6.4.	Test Procedure	
6.5.	Uncertainty	
6.6.	Test Result of Band Edge	
7.	CHANNEL NUMBER	45
7.1.	Test Equipment	
7.2.	Test Setup	
7.3.	Limit	
7.4.	Test Procedure	
7.5.	Uncertainty	
7.6.	Test Result of Channel Number	
8.	CHANNEL SEPARATION	
8.1.	Test Equipment	
8.2.	Test Setup	
8.3.	Limit	
8.4.	Test Procedure	
8.5.	Uncertainty	
8. <i>5</i> . 8.6.		
	Test Result of Channel Separation	
9.	DWELL TIME	
9.1.	Test Equipment	

9.2.	Test Setup	53
9.3.	Limit	53
9.4.	Test Procedure	53
9.5.	Uncertainty	53
9.6.	Test Result of Dwell Time	54
10.	OCCUPIED BANDWIDTH	58
10.1.	Test Equipment	
10.2.	Test Setup	
10.3.	Limits	
10.4.	Test Procedure	
10.5.	Uncertainty	
10.6.	Test Result of Occupied Bandwidth	
11.	EMI REDUCTION METHOD DURING COMPLIANCE TESTING	
Attachm	ent 1: EUT Test Photographs	

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Car Radio with BT	
Trade Name	clarion	
Model No.	BTS33	
FCC ID.	2ABGYBTS33-CLARION	
Frequency Range	2402 – 2480MHz	
Channel Number	ber 79	
Type of Modulation	FHSS: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps)	
Antenna Type	PCB Antenna	
Channel Control	Auto	
Antenna Gain	Refer to the table "Antenna List"	

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	HJ solution	HJANT-001	PCB Antenna	-1 dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203.

Center Frequency of Each Channel:

1	_		_		_		_
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

- 1. The EUT is a Car Radio with BT with a built-in Bluetooth transceiver.
- 2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
- 3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 4. Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through pre-testing, to produce emissions similar to those for 3Mb/s.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK)	
	Mode 2: Transmit - 3Mbps (8DPSK)	

1.2. Operational Description

The EUT is an Car Radio with BT with built-in 2.4GHz Bluetooth transceiver. The number of the channels is 79 in 2402-2480MHz. The device adapts the frequency hopping spread spectrum modulation. The antenna is PCB antenna and provides diversity function to improve the receiving function.

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

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. The transmitter is presented with a continuous data stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its 79 channels and over the minimum number of hopping channels (75 channels).

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted.

The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

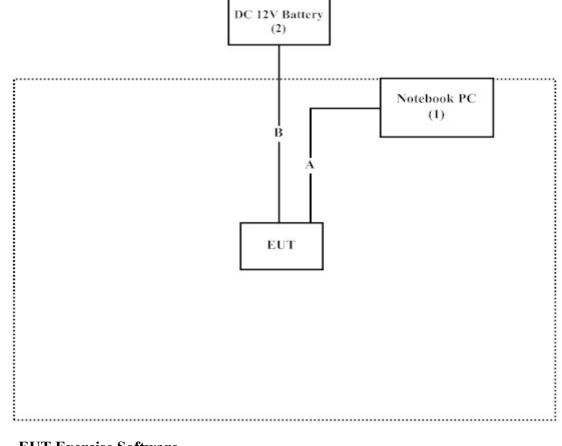
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Proc	duct	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	PP04X	7607342512	Non-Shielded, 0.8m
2	DC 12V Battery	TRANE	12B50PE	N/A	N/A

Signal Cable Type		Signal cable Description
А	LAN to USB Cable	Non-Shielded, 2.0m
В	Power Cable	Non-Shielded, 2.0m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT and Peripherals as shown on 1.4
- (2) Execute "Blue Suite.exe (v2.5)" on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Start transmits continually.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

Ambient conditions in the laboratory:

The related certificate for our laboratories about the test site and management system can be downloaded

from QuieTek Corporation's Web Site: <u>http://www.quietek.com/tw/ctg/cts/accreditations.htm</u> The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: <u>http://www.quietek.com/</u>

Site Description:	File on
	Federal Communications Commission
	FCC Engineering Laboratory
	7435 Oakland Mills Road
	Columbia, MD 21046
	Registration Number: 92195

Site Name:	Quietek Corporation
Site Address:	No.5-22, Ruishukeng,
	Linkou Dist. New Taipei City 24451,
	Taiwan, R.O.C.
	TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
	E-Mail : <u>service@quietek.com</u>

FCC Accreditation Number: TW1014

2. Conducted Emission

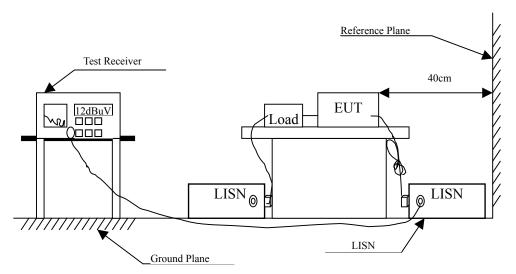
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
Х	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
Х	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2013	Peripherals
Х	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2013	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2013	EUT
Х	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2013	
	No.1 Shielded Room				

Note:

- 1. All equipments are calibrated every one year.
- 2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit				
Frequency	Lir	nits		
MHz	QP	AV		
0.15 - 0.50	66-56	56-46		
0.50-5.0	56	46		
5.0 - 30	60	50		

2.3. Limits

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /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 the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

3. Peak Power Output

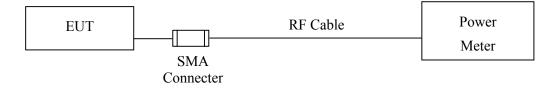
3.1. Test Equipment

_	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
Х	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2013

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

3.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

 \pm 1.27 dB

3.6. Test Result of Peak Power Output

Product	:	Car Radio with BT
Test Item	:	Peak Power Output
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency	Measurement	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	-5.12	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-7.93	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-11.14	1 Watt= 30 dBm	Pass

:	Car Radio with BT
:	Peak Power Output
:	No.3 OATS
:	Mode 2: Transmit - 3Mbps (8DPSK)
	•

Channel No.	Frequency	Measurement	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	-6.13	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-9.07	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-12.33	1 Watt= 30 dBm	Pass

4. Radiated Emission

4.1. Test Equipment

The following test equipments are used during the radiated emission test:

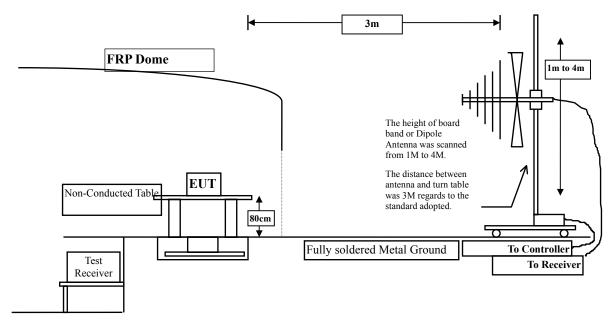
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	Х	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	Х	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	Х	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	Х	Spectrum Analyzer	Agilent	Spectrum Analyzer	May, 2013
	Х	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated every one year.

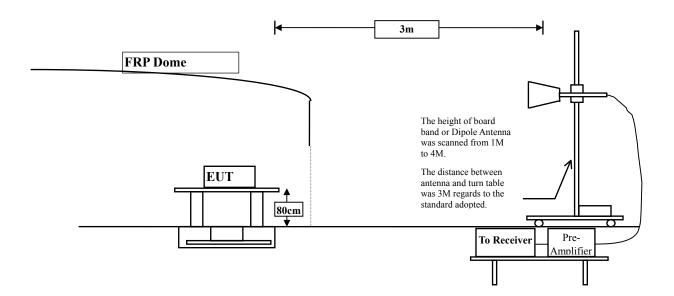
2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup

Below 1GHz



Above 1GHz



4.3. Limits

General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits				
Frequency MHz	Field strength	Measurement distance		
	(microvolts/meter)	(meter)		
0.009-0.490	2400/F(kHz)	300		
0.490-1.705	24000/F(kHz)	30		
1.705-30	30	30		
30-88	100	3		
88-216	150	3		
216-960	200	3		
Above 960	500	3		

Remarks: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10, 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement. The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The worst radiated emission is measured on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

Product Test Item Test Site Test Mode	: Harmoni : No.3 OA		sion s (GFSK)(2402MHz))	
Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level	-	
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4804.000	3.327	55.050	58.377	-15.623	74.000
7206.000	10.136	38.390	48.526	-25.474	74.000
9608.000	13.706	36.510	50.216	-23.784	74.000
Average Detector:					
4804.000	3.327	46.600	49.927	-4.073	54.000
Vertical					
Peak Detector:					
4804.000	6.638	55.270	61.907	-12.093	74.000
7206.000	11.005	38.050	49.055	-24.945	74.000
9608.000	14.103	36.100	50.203	-23.797	74.000
Average Detector:					
4804.000	6.638	46.110	52.747	-1.253	54.000

4.6. Test Result of Radiated Emission

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Car Radio with BT						
Test Item	: Harmoni	: Harmonic Radiated Emission					
Test Site	: No.3 OA	: No.3 OATS					
Test Mode	: Mode 1:	Transmit - 1Mbp	os (GFSK)(2441MHz))			
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4882.000	3.001	51.920	54.921	-19.079	74.000		
7323.000	11.846	36.040	47.887	-26.113	74.000		
9764.000	12.563	36.530	49.093	-24.907	74.000		
Average Detector:							
4882.000	3.001	32.690	35.691	-18.309	54.000		
Vertical							
Peak Detector:							
4882.000	5.713	52.710	58.424	-15.576	74.000		
7323.000	12.727	35.370	48.098	-25.902	74.000		
9764.000	13.028	37.110	50.138	-23.862	74.000		
Average Detector:							
4882.000	5.713	33.550	39.264	-14.736	54.000		

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Test Item	 Car Radio with BT Harmonic Radiated Emission 					
Test Site	: No.3 OATS					
Test Mode			s (GFSK)(2480MHz))		
		_				
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
Peak Detector:						
4960.000	2.760	53.120	55.880	-18.120	74.000	
7440.000	12.567	35.030	47.596	-26.404	74.000	
9920.000	13.456	35.180	48.636	-25.364	74.000	
Average Detector:						
4960.000	2.760	40.350	43.110	-10.890	54.000	
Vertical						
Peak Detector:						
4960.000	5.557	53.310	58.867	-15.133	74.000	
7440.000	13.426	35.360	48.785	-25.215	74.000	
9920.000	13.958	36.020	49.978	-24.022	74.000	
Average Detector:						
4960.000	5.557	40.030	45.587	-8.413	54.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Car Radio with BT						
Test Item	: Harmon	: Harmonic Radiated Emission					
Test Site	: No.3 OA	: No.3 OATS					
Test Mode	: Mode 2:	Transmit - 3Mbp	s (8DPSK)(2402MH	z)			
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4804.000	3.327	57.240	60.567	-13.433	74.000		
7206.000	10.136	36.910	47.046	-26.954	74.000		
9608.000	13.706	35.910	49.616	-24.384	74.000		
Average Detector:							
4804.000	3.327	45.330	48.657	-5.343	54.000		
Vertical							
Peak Detector:							
4804.000	6.638	55.500	62.137	-11.863	74.000		
7206.000	11.005	37.090	48.095	-25.905	74.000		
9608.000	14.103	36.830	50.933	-23.067	74.000		
Average Detector:							
4804.000	6.638	43.540	50.177	-3.823	54.000		

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Test Item	 Car Radio with BT Harmonic Radiated Emission 						
Test Site		: No.3 OATS					
Test Mode	: Mode 2:	Transmit - 3Mbp	os (8DPSK) (2441MH	[z)			
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4882.000	3.001	53.180	56.181	-17.819	74.000		
7323.000	11.846	35.880	47.727	-26.273	74.000		
9764.000	12.563	36.500	49.063	-24.937	74.000		
Average Detector:							
4882.000	3.001	40.220	43.221	-10.779	54.000		
Vertical							
Peak Detector:							
4882.000	5.713	53.330	59.044	-14.956	74.000		
7323.000	12.727	35.500	48.228	-25.772	74.000		
9764.000	13.028	37.190	50.218	-23.782	74.000		
Average Detector:							
4882.000	5.713	40.120	45.834	-8.166	54.000		

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Test Item Test Site	 Car Radio with BT Harmonic Radiated Emission No.3 OATS 				
Test Mode			s (8DPSK) (2480MH	z)	
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4960.000	2.760	49.630	52.390	-21.610	74.000
7440.000	13.426	34.790	48.215	-25.785	74.000
9920.000	13.958	36.140	50.098	-23.902	74.000
Average Detector:					
Vertical					
Peak Detector:					
4960.000	5.557	48.400	53.957	-20.043	74.000
7440.000	13.426	35.410	48.835	-25.165	74.000
9920.000	13.958	35.660	49.618	-24.382	74.000

Average Detector:

--

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Car Radio with BT					
Test Item	: General Radiated Emission					
Test Site	: No.3 O.	ATS				
Test Mode	: Mode 1	: Transmit - 1Mbp	s (GFSK) (2441MHz	z)		
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
70.740	-12.921	46.560	33.639	-6.361	40.000	
173.560	-9.954	42.778	32.825	-10.675	43.500	
299.660	-3.585	39.554	35.969	-10.031	46.000	
392.780	-2.096	37.527	35.431	-10.569	46.000	
573.200	2.537	33.752	36.289	-9.711	46.000	
840.920	5.191	34.253	39.444	-6.556	46.000	
Vertical						
128.940	-4.128	40.024	35.896	-7.604	43.500	
266.680	-8.213	45.402	37.189	-8.811	46.000	
363.680	-2.393	35.289	32.896	-13.104	46.000	
507.240	-0.471	32.803	32.332	-13.668	46.000	
608.120	-1.576	31.746	30.170	-15.830	46.000	
825.400	3.430	29.836	33.266	-12.734	46.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

Product Test Item Test Site Test Mode	: Genera : No.3 O		on os (8DPSK) (2441MH	[z)	
Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
231.760	-8.338	49.079	40.741	-5.259	46.000
402.480	-2.263	39.099	36.836	-9.164	46.000
483.960	-0.688	34.027	33.340	-12.660	46.000
697.360	3.171	30.622	33.793	-12.207	46.000
819.580	5.789	30.671	36.461	-9.539	46.000
908.820	6.029	36.271	42.300	-3.700	46.000
Vertical					
156.100	-6.201	37.285	31.083	-12.417	43.500
291.900	-8.004	42.634	34.629	-11.371	46.000
400.540	-5.156	37.232	32.077	-13.923	46.000
513.060	-0.670	38.507	37.837	-8.163	46.000
592.600	-4.823	38.014	33.191	-12.809	46.000
751.680	2.850	31.050	33.900	-12.100	46.000

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

5. **RF Antenna Conducted Test**

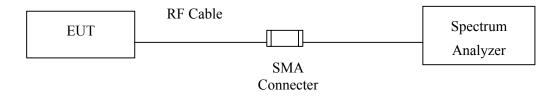
5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note: 1. All equipments are calibrated every one year.

2. The test instruments Marked "X" are used to measure the final test results.

5.2. Test Setup



5.3. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

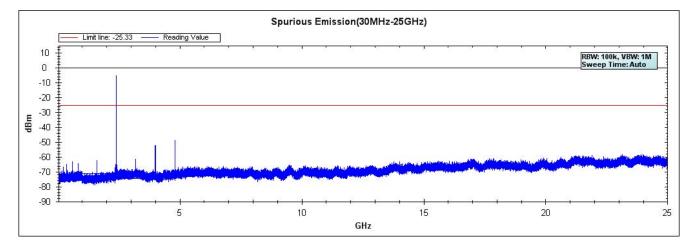
5.5. Uncertainty

± 150Hz

5.6. Test Result of RF Antenna Conducted Test

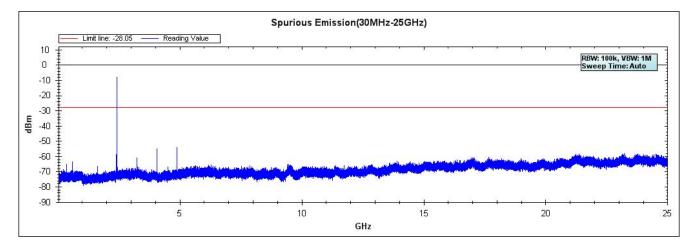
Product	:	Car Radio with BT
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Figure Channel 00:



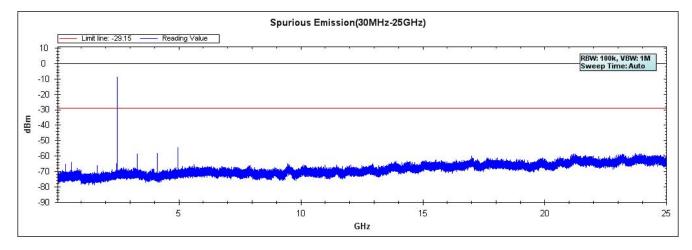
:	Car Radio with BT
:	RF Antenna Conducted Test
:	No.3 OATS
:	Mode 1: Transmit - 1Mbps (GFSK)
	:

Figure Channel 39:



Product	:	Car Radio with BT
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Figure Channel 78:



Product	:	Car Radio with BT
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

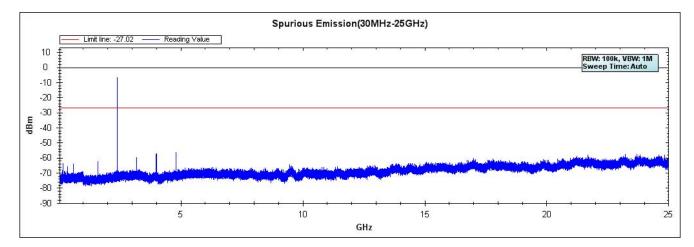
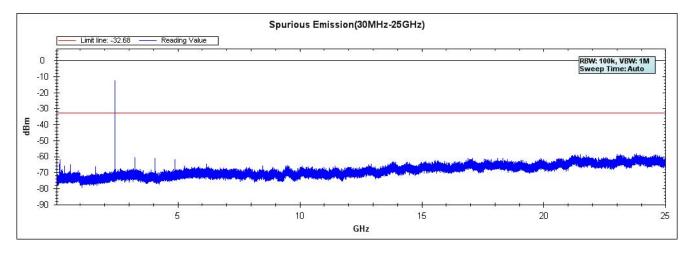


Figure Channel 00:

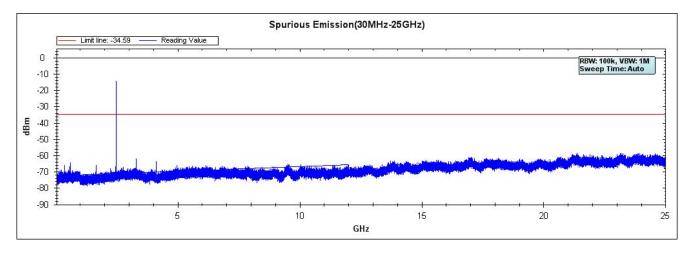
Product	:	Car Radio with BT
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Figure Channel 39:



Product	:	Car Radio with BT
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Figure Channel 78:



6. Band Edge

6.1. Test Equipment

RF Conducted Measurement

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

RF Radiated Measurement:

The following test equipments are used during the band edge tests:

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	Х	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

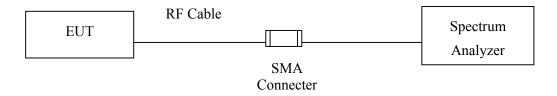
Note:

1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

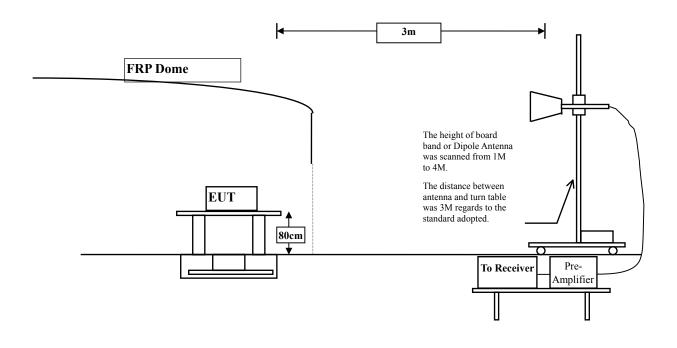
6.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1GHz



6.3. 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2009 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

6.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

Product	:	Car Radio with BT
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2402	-1.073	95.75	94.678	Peak
Horizontal	2402	-1.073	81.61	80.538	Average
Vertical	2402	-1.729	94.27	92.541	Peak
Vertical	2402	-1.729	80.48	78.751	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	FrequencyFundamental (dBuV/m) Δ (dB)Field Strength		Limit (dBuV/m)	Detector	
Horizontal	2375.9	94.678	52.26	42.418	74.000	Peak
Horizontal	2376	80.538	48.54	31.998	54.000	Average
Vertical	2375.9	92.541	52.26	40.281	74.000	Peak
Vertical	2376	78.751	48.54	30.211	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements

per the Marker-Delta Method with the following formula:

Band Edge field Strength = $F - \Delta$

F = Fundamental field Strength (Peak or Average)

 Δ = Conducted Band Edge Delta (Peak or Average)

Frequency	MNov 18, 2013		ALIGN AUTO		INT.	SENSE			F 50 :			RL
	E 1 2 3 4 5 6 E M WWWWW T P N N N N N	TYP	: Log-Pwr	Avg Typ] Trig: Free R #Atten: 20 d	Hz PNO: Fast 😱 Gain:Low		2.3900	req	ter l	ent
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Freq Off						-60.33 dBn -57.05 dBn	0 GHz (Δ) 9 GHz	2.390	(Δ)	1 f 1 f	N	3
0												5
									0			7
												9 0 1
												2

Peak Detector of conducted Band Edge Delta

Average Detector of conducted Band Edge Delta

Agilent Spectrum Analyzer					No.							
Center Freq 2.39	50 Ω AC 0000000 GHz PNO: Fast	SENS	Avg 1 lun	ALIGNAUTO Type: Log-Pwr	12:06:55 PMM TRACE TYPE	Nov 18, 2013 1 2 3 4 5 6 M WWWWWW P N N N N N	Frequency					
	Mkr3 2.376 0 GHz											
-10.0			1				Center Fre 2.390000000 GH					
-30.0 -40.0 -50.0							Start Fre 2.340000000 G⊢					
60.0 70.0 80.0				horn			Stop Fre 2.440000000 GH					
Center 2.39000 GH #Res BW 1.0 MHz		BW 10 Hz	FUNCTION	Sweep	Span 10 7.80 s (10	001 pts)	CF Ste 10.000000 MH Auto Ma					
N 1 Γ Γ 2 N 1 Γ 3 N 1 Γ 4 - - 5 - - 6 - - 7 - - 9 - - 10 - - 12 - -	2.402 0 GHz 2.390 0 GHz 2.376 0 GHz	-18.28 dBn	n n				Freq Offs					
ISG				STATUS								

Product	:	Car Radio with BT
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Fundamental Filed Strength

Antenna Pole	FrequencyCorrection FactorI[MHz][dB/m]I		Reading Level [dBuV]	Emission Level [dB(uV/m)]	Detector
Horizontal	2480	-0.581	94.3	93.719	Peak
Horizontal	2480	-0.581	81.02	80.439	Average
Vertical	2480	-1.324	93.31	91.986	Peak
Vertical	2480	-1.324	80.24	78.916	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	93.719	49.25	44.469	74.000	Peak
Horizontal	2483.5	80.439	48.49	31.949	54.000	Average
Vertical	2483.5	91.986	49.25	42.736	74.000	Peak
Vertical	2483.5	78.916	48.49	30.426	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements

per the Marker-Delta Method with the following formula:

Band Edge field Strength = $F - \Delta$

F = Fundamental field Strength (Peak or Average)

 Δ = Conducted Band Edge Delta (Peak or Average)

Agilent S	pectrun																		
Cente	er Fre	RF		AC] Trig: I		ISE:INT		Avg		ALIGNAUTO : Log-Pwr		RACE 1	2 3 4 5 6	Fre	quency
	IFGain:Low #Atten: 20 dB DET PNNNN Mkr2 2.483 5 GHz													1	Auto Tune				
	0 dB/div Ref 10.00 dBm -57.48 dBm																		
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MSG														STATU	5				

Peak Detector of conducted Band Edge Delta

Average Detector of conducted Band Edge Delta

Agilent Spectrum Analyzer - Sw												
KE RF 50 Ω Center Freq 2.48350	AC DOOOD GHz PNO: Fast	SENSE:INT	ALIGN AU Avg Type: Log-Pv		Frequency							
	IFGain:Low #Atten: 20 dB DETIP NNNN Mkr2 2.483 5 GHz											
10 dB/div Ref 10.00	dBm		1	-69.60 0.611								
-10.0		1			Center Freq 2.483500000 GHz							
-20.0		X										
-40.0					Start Fred 2.433500000 GHz							
-60.0	~	2			Stop Fred 2.533500000 GHz							
-80.0 Center 2.48350 GHz				Span 100.0 MHz								
#Res BW 1.0 MHz	#VBW [/]	I0 Hz	Swe	Sweep 7.80 s (1001 pts) 10.00000								
MKR MODE TRC SCL	× 2.480 0 GHz	-21.11 dBm	NCTION FUNCTION WI	DTH FUNCTION VALUE	<u>Auto</u> Mar							
2 N 1 f (Δ) 3 - - - -	2.483 5 GHz (Δ)	-69.60 dBm			Freq Offset 0 Hz							
7 8 9 10												
11 12												
MSG			STA	TUS								

Product	:	Car Radio with BT
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Fundamental Filed Strength

Antenna Pole	· ·		Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2402	-1.073	95.56	94.488	Peak
Horizontal	2402	-1.073	80.48	79.408	Average
Vertical	2402	-1.729	94.24	92.511	Peak
Vertical	2402	-1.729	78.82	77.091	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2375.9	94.488	51.19	43.298	74.000	Peak
Horizontal	2376	79.408	47.34	32.068	54.000	Average
Vertical	2375.9	92.511	51.19	41.321	74.000	Peak
Vertical	2376	77.091	47.34	29.751	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = $F - \Delta$

F = Fundamental field Strength (Peak or Average)

 Δ = Conducted Band Edge Delta (Peak or Average)

RL		RF	5	0Ω	AC					SEN	ISE:INT				ALIGN/		02:18:1	.0 PM N	ov 18, 201:	3 _
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enter Res B				z		0.5	#V	BW	1.0 M	ЛНz					#Sw	eep	Span 500 ms	n 100 s (10	0.0 MH: 01 pts	CF St
R MODE	TRC 1	SCL f			× 2.4	019	GHz			34 dE		FUNC	TION	FU	NCTION	WIDTH	FUN	CTION V	ALUE	Auto M
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5											-									0
7 3 9																				-
0														-						-
		_	÷					-							1		1			

Peak Detector of conducted Band Edge Delta

Average Detector of conducted Band Edge Delta

RL	RF 50 Ω	AC	SE	NSE:INT		ALIGN AUTO		4Nov 18, 2013	Engeneers
enter Fr	eq 2.39000	0000 GHz	Trig: Free	Dun	Avg Typ	e: Log-Pwr	TRAC TVP	E 1 2 3 4 5 6	Frequency
		PNO: Fast IFGain:Lov					DE	E MWWWWW T P N N N N N	
			v.			Mk		0 GHz	Auto Tun
0 dB/div og	Ref 10.00 d	Bm					-68.9	95 dBm	
0.00									Center Fre
10.0									2.390000000 GH
20.0									2.530000000 GI
30.0					Δ				
40.0					$\langle \rangle$				Start Fro
50.0									2.34000000 G
50.0			3						
70.0			Č (2					Stop Fr
30.0									2.440000000 G
enter 2.3 Res BW	9000 GHz	40.1	BW 10 Hz			Owen		00.0 MHz	CF Ste
								1001 pts)	10.000000 M
KR MODE TR	C SCL	× 2.402 0 GHz	-21.61 d		NCTION	UNCTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u> M
2 N 1	f (Δ)	2.390 0 GHz	(Δ) -72.24 dl	Зm					
3 N 1 4	f	2.376 0 GHz	-68.95 dl	∃m					Freq Offs
5									0
7									
8									
2									
G						STATUS			

Product	:	Car Radio with BT
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dB(uV/m)]	Detector
Horizontal	2480	-0.581	93.19	92.609	Peak
Horizontal	2480	-0.581	77.66	77.079	Average
Vertical	2480	-1.324	92.66	91.336	Peak
Vertical	2480	-1.324	77.37	76.046	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	92.609	47.65	44.959	74.000	Peak
Horizontal	2483.5	77.079	44.89	32.189	54.000	Average
Vertical	2483.5	91.336	47.65	43.686	74.000	Peak
Vertical	2483.5	76.046	44.89	31.156	54.000	Average

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = $F - \Delta$

F = Fundamental field Strength (Peak or Average)

 Δ = Conducted Band Edge Delta (Peak or Average)

S	rum Analyzer - Sw								
Center F	RF 50 Ω req 2.48350			BUN	Avg Type	ALIGNAUTO E: Log-Pwr	TRAC	MNov 18, 2013 E 1 2 3 4 5 6 E MWWWWW	Frequency
10 dB/div	Ref 10.00 (PNO: Fast (IFGain:Low	#Atten: 20			Mk	r2 2.48	3 5 GHz 12 dBm	Auto Tune
-10.0									Center Freq 2.483500000 GHz
-30.0 -40.0 -50.0				2					Start Freq 2.433500000 GHz
-60.0	<u>-400-4008-908-90</u> 0	T ^{an} apogeganiti injenitje kream nepez	2				000000000000000000000000000000000000000	and - an ageneiting Second	Stop Freq 2.533500000 GHz
#Res BW	RC SCL	×	SW 1.0 MHz		INCTION	#Sweep	500 ms (00.0 MHz 1001 pts) INVALUE	CF Step 10.000000 MHz <u>Auto</u> Man
1 N 1 2 N 1 3	f (Δ)	2,479 9 GHz 2,483 5 GHz (/	-10.47 dB ∆) -58.12 dB						Freq Offset 0 Hz
11 12 MSG						STATUS			

Peak Detector of conducted Band Edge Delta

Average Detector of conducted Band Edge Delta

Agilent Spectrum Analyzer - Sw	0		lucted Danu Eu	8	
X RL RF 50 Ω Center Freq 2.48350	AC DOOOO GHz PNO: Fast IFGain:Low	SENSE:INT Trig: Free Run #Atten: 20 dB	ALIGNAUTO Avg Type: Log-Pwr	02:30:35 PM Nov 18, 2013 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N N	Frequency
10 dB/div Ref 10.00 dB/div	dBm		Mk	r2 2.483 5 GHz -70.31 dBm	
-10.0		1			Center Fre 2.483500000 GH
40.0					Start Fre 2.433500000 GF
60.0 70.0 80.0	· · · · · · · · · · · · · · · · · · ·	2			Stop Fre 2.533500000 GH
enter 2.48350 GHz Res BW 1.0 MHz	#VBW	10 Hz	Sweep	Span 100.0 MHz 7.80 s (1001 pts)	CF Ste 10.000000 MI
R MODE TRC SCL 1 N 1 f 2 N 1 f (Δ)	× 2.480 0 GHz 2.483 5 GHz (Δ)	-25.42 dBm -70.31 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 f (Δ) 3 4 5 5 6		-70.51 uBm			Freq Offs 0 H
7 8 9 10 11 12					
ISG			STATUS		

7. Channel Number

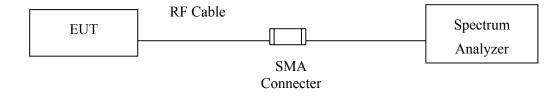
7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

7.2. Test Setup



7.3. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

7.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

7.5. Uncertainty

N/A

7.6. Test Result of Channel Number

Product	:	Car Radio with BT
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Frequency Range	Measurement	Required Limit	Result
(MHz)	(Hopping Channel)	(Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2421MHz

2422-2441MHz

Agliant S	pectru																						ectrum	Inaly	zer Swa	ept SA														
Cente	er Fr	eq				GH	z	·	. _T	ig:Fre			A	у Тур	a: Log-P		1256ch Tř	VPNNix 11, 215 NGC 1 2 3 4 5 1 TVPC Mysteres DCT P NNNN		Frequency	Ce			2.4	43150) GH	z		Trig: Fre	• Pup	Avg		Log-Pwr)in:	11:CIP TRAI TV	MNary 111, 17 1 2 3 4 PT MWWW	20101 156	Fre	quency
10 dB/c	410	Re	r 10.0	in de	um	IF6	il): Fa ialin:L	od (₁ owr	, #A	itten: 2	20 dB				N	lkr2	2.42	1 00 GHz	a	Auto Tune	10.	dB/d	lu R	ef 1	0.00 (dBm	PN IFG	D: Faed alm:Low		Atten: 2	0 dB			Mk	r 2 2 .	ہ 441	00 G 33 dE	Hz		Auto Tune
Log			Ŵ	V	7	Ą	/1	Л	h	۲V	h	M	h	<i>(</i> n	n	ų	rv.	VV	⊫	Center Freq 2.411600000 GHz	Log 0.0 -10 -20			5		h	n	ŕ٧	γ	V١	Ň	vr	n	лл	h	Δ	N	Â		enter Freq 500000 GHz
30.0																			2	Start Freq 401500000 GHz	00. 40. 50.	u U																		Start Freq 500000 GHz
-60 N -70 N -80 N																			⊩	Stop Freq 2.421500000 GHz	-81	n n																		Stop Freq
Start 2 #Res I	BW	100	kHz		×		#	VBV	V 10	0 kH:	z	81	VETION	51	Swee	р 2	2.47 ms	42150 GH; (1001 pts)	Aut	CF Step 2.000000 MHz to Man	#R	es E	.4215 SW 10	0 kł	Hz Iz	×		#VE	BW 1	00 kHz		NCTION	_	Sweep	2.47	ms (4150 C 1001 p	pts)		CF Step
1 N 2 N 3 4 6 5	1	f				02 00 21 00		z (A)		5.15 c 5.65 c										Freq Offset 0 Hz	1	NN	1	F	U		422 00 441 00	GHz GHZ	Δ	-5.61 c -5.33 c	IBm								_	req Offset 0 Hz
7 8 9 10 11 12																					7 8 9 10 11 12	-																		
MSG															s	AIUS					мес													STATU	rs -					

2442-2461MHz

2462-2480MHz

Aglient Spectrum Analyzer - Swept SA			Aglient Spectrum Analyzer - Swept SA
Image: State of the s	10:15:25 PMN w 10,2000 TRACT 12:3:4:5:0 TVP M	Frequency	Di R
Il-GalinLow #Atten: 20 dB Mk 10 dB/dly Ref 10.00 dBm	r2 2.461 00 GHz -7.45 dBm	Auto Tune	ne Mkr2 2.480 00 GHz Auto Tr 10 dB/d/v Ref 10.00 dBm -8.92 dBm
		Center Freq 2.451500000 GHz	
000		Start Freq 2.441500000 GHz	
-600 -700 -800		Stop Freq 2.461500000 GHz	
	Stop 2.46150 GHz 2.47 ms (1001 pts)	2.000000 MHz	
CDC2 EXCERT Y FUNCTION FUNCTIO	H FUNCTION VALUE	Auto Man Freg Offset	1 N 1 f 2.462 00 GHz -7.44 dBm 2 N 1 f (Δ) 2.480 00 GHz (Δ) -8.92 dBm
4 6 5 7		0 Hz	
8 9 10 11			
11 12	15		12 IIIIII

Product	:	Car Radio with BT
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
$2402 \sim 2480$	79	>75	Pass

2402-2421MHz

2422-2441MHz

Agilant Spactrum Analyzar - Swapt SA		Apilant Spectrum Analyzer - Swept SA
XI RF SD R SENSEDIT ALISNAUTO D2:41:37 FM Nov 18, 2015 Center Freq 2.411500000 GHz Avg Type: Log-Pwr IKA22 D2:14:56	Frequency	μ RF 50 Ω AC SENSED/T ALIGNAUTO D2:47:40 FMIN0/ 18, 2013 Frequency Center Freq 2.431500000 GHz Avg Type: Log-Pwr IMACE [2:1:4:5:6] Frequency
PNO: Fast Trig: Free Run PNE/Monotone If Going way #Atten: 20 dB cerif NNNN	·	PND: Fast Trig: Free Run Interfere Run Interfere Run Interfere Run Interfere Run Extens 20 dB Uet P NN NN N
Mkr2 2.421 00 GHz 10 dB/div Ref 10.00 dBm -8.14 dBm		Mkr2 2.441 00 GHz Auto IU 10 dB/div Ref 10.00 dBm -10.30 dBm
un and a contraction of the second se	Center Freq 2.411500000 GHz	Log um 1 um 1 u um 1 um 1 u um 1 um 1 u um 1 um 1 u um 1 um 1
.an -nn -m	Start Freq 2.401500000 GHz	-30 n -01 n -01
wu	Stop Freq 2.421500000 GHz	Stop Fr 000 2.44150000 0
Start 2.40150 GHz Stop 2.42150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.47 ms (1001 pts)		Start 2.42150 GHz Stop 2.44150 GHz CF St #Res BW 100 kHz #VBW 100 kHz Sweep 2.47 ms (1001 pts) 2.000000 M
1 Λ Γ 2.402 00 GHz -7.33 dBm Η ΜΑΗ ΝΑΚΟΗΗ Η ΜΑΗ ΝΑΚΟΗ ΝΑΚΟΗΗ Η ΜΑΗ ΝΑΚΟΗΗ	Auto Man	M22 N X HAMBER HIMBLE AVAIL HIMBLE AVAIL Auto Auto N 2 N 1 Γ 2.422 00 GHz -7.99 dBm -
1 1	Freq Offset	n r <thr< th=""> r <thr< th=""> <thr< th=""></thr<></thr<></thr<>
1 -		7
		11

2442-2461MHz

2462-2480MHz

Applant Spectrum Analyzer - Swept SA		Applant Spectrum Analyzer - Swept SA	
M RF TOD AC SENSEDIT ALISIAUTO D25227FMNov I8,2013 Center Freq 2.451500000 GHz Trig: Free Run Avg Type: Log-Pwr IPARE []: 14 5 h	Frequency	M RF DO AC SENSED/T ALIGNAUTO D2:72:10 FMNov 18, 2013 Center Freq 2.471500000 GHz Avg Type: Log-Pwr INAX6 [10:14 sh INAX6 [10:14 sh INAX6 [10:14 sh	Frequency
IFCoinci www #Atten: 20 dB Del P NNNN	. A	IFGuind war #Atten: 20 dB Use P NNNNN	Auto Tune
Mkr2 2.461 00 GHz 10 dB/div Ref 10.00 dBm -12.81 dBm		Mkr2 2.480 00 GHz 10 dBidiy Ref 10.00 dBm -12.15 dBm	
^{Log} ^{um} ¹ ^{um} ¹ ¹ ¹ ^{um}	Center Freq 2.451500000 GHz	www.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m	Center Freq 2.471500000 GHz
-00 -00 -01	Start Freq 2.441500000 GHz		Start Free 2.481500000 GH:
	Stop Freq 2.461500000 GHz		Stop Free 2.481500000 GH
Start 2.44150 GHz Stop 2.46150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.47 ms (1001 pts)	2.000000 MHz	Start 2.45150 GHz Stop 2.48150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.47 ms (1001 pts)	CF Step 2.000000 MH
C01 C02 (100 (100 (100 (100 (100 (100 (100 (1	Auto Man	Σ20 CEDIC (112) EX Y ΠΟΝΠΑΛΑΝΤΗΙ ΠΕΛΕΓΕΛΑΝΤΗ ΠΕΛΕΓΕΛΑΝΤΗ	Auto Mar
1 1	Freq Offset 0 Hz		Freq Offsel 0 Ha
9		9 8 10 11	
12 STATUS		12	

8. Channel Separation

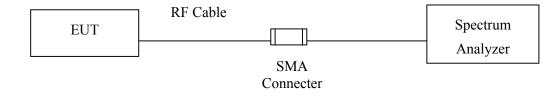
8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note: 1. All equipments are calibrated every one year.

2. The test instruments mark by "X" are used to measure the final test results.

8.2. Test Setup



8.3. 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.

8.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

8.5. Uncertainty

± 150Hz

8.6. Test Result of Channel Separation

Product	:	Car Radio with BT
Test Item	:	Channel Separation
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

	F	Measurement	Limit	Limit of (2/3)*20dB		
Channel No.	Frequency	Level	(1-11-)		Result	
	(MHz)	(kHz)	(kHz)	Bandwidth (kHz)		
00	2402	1000	>25 kHz	753.3	Pass	
39	2441	1000	>25 kHz	753.3	Pass	
78	2480	1000	>25 kHz	760.0	Pass	

NOTE: The 20dB Bandwidth is refer to section 10.

RL	RF 50 Ω	AC		SEN	ISE:INT		ALIGN AUTO	12:15:13 P	MNov 18, 2013	_
enter F	req 2.40200	PN	IZ O: Wide 🍙 ain:Low	Trig: Free #Atten: 20		Avg Type	e: Log-Pwr	TRAC TYP	E 1 2 3 4 5 6 E MWWWWW T P N N N N N	Frequency
) dB/div	Ref 10.00 d	dBm					Mkr		00 GHz 77 dBm	Auto Tur
og 0.00 0.0 0.0				1		2				Center Fr 2.402000000 G
0.0 0.0 0.0	Λ_ <i>Λ</i>	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				www	M		Start Fr 2.397000000 G
0.0 0.0 0.0									which have a second sec	Stop Fr 2.407000000 G
	402000 GHz 100 kHz	×	#VBW	100 kHz	FIIN		#Sweep	500 ms (0.00 MHz 1001 pts) NVALUE	CF St 1.000000 M Auto M
1 N 1 2 N 1 3 4 5 6		2.402 00	D GHz D GHz (Δ)	-5.67 dE -5.77 dE	3m					Freq Offs
7										
3 3 3 1 2						1				

Channel 00 (2402MHz)

Off RL RF IOQ AC Issuerning Autowation D2-42-34 MINVo 10,2013 Frequency Center Freq 2.441000000 GHz IFGainLow Trig: Free Run IFGainLow Avg Type: Log-Pwr #Atten: 20 dB Trace [1:2:4:3:4 MINVo 18,2013 Trace [1:2:4:4 MINVO 18,20			ctru	m An	alyzer -	Swep	t SA											
Important Autonum 10 dB/div Ref 10.00 dBm -7.11 dBm 0.00 -7.11 dBm -7.11 dBm 0.00 -7.01 -7.01 0.00 -7.01 -7.01 0.00 -7.01 -7.01 0.00 -7.01 -7.02 0.00 -7.02 dBm -7.02 dBm 1 -7.02 dBm -7.02 dBm 1 <td></td> <td></td> <td>Fre</td> <td></td> <td>Avg</td> <td></td> <td>TRA</td> <td>CE 1 2 3 4 5 6</td> <td>Frequency</td>			Fre											Avg		TRA	CE 1 2 3 4 5 6	Frequency
0.00 1 2 Center Freq 2.44100000 GHz 300			,	Rei	f 10.0)0 dl	Зm	PNO: IFGai	: Wide in:Low						 Mkr	2 2.442	00 GHz	Auto Tune
40.0 50.0 70.0 40.0 <t< td=""><td>0.00 -10.0</td><td>) </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>5</td><td>h</td><td>\checkmark</td><td>2</td><td></td><td></td><td></td><td>a construction of the second se</td></t<>	0.00 -10.0) 									5	h	\checkmark	2				a construction of the second se
Tool Stop Freq 2.44600000 GHz Center 2.441000 GHz #VBW 100 kHz Span 10.00 MHz CF Stop 1.00000 MHz Model TRO Sci X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Mass Model TRO Sci X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Mass Model TRO Sci X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Mass Model TRO Sci X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Mass Model TRO Sci X Y FUNCTION FUNCTION VALUE Auto Mass Model TRO Sci X Y FUNCTION FUNCTION VALUE Auto 3 1 f (Δ) 2.442 00 GHz (Δ) -7.11 dBm Function Value Freq Offset 6 I I I I I Function Value Function Value 9 I I I I I I I I I I </td <td>-40.0 -50.0</td> <td></td> <td></td> <td></td> <td>~</td> <td></td> <td>www</td> <td>\sim</td> <td>two</td> <td>r.</td> <td>/</td> <td></td> <td></td> <td></td> <td>han</td> <td>hand</td> <td></td> <td></td>	-40.0 -50.0				~		www	\sim	two	r.	/				han	hand		
#Res BW 100 kHz #VBW 100 kHz #Sweep 500 ms (1001 pts) CF Step 1.00000 MHz MKG M000 TRC SCL X Y FUNCTION FUNCTION wiDTH FUNCTION VALUE Auto Man 2 N 1 f 2.441 00 GHz -7.02 dBm FUNCTION WIDTH FUNCTION VALUE Auto Man 3 -	-70.0	wheet			ut ing C											Mar North	manne	
2 N 1 f (Δ) 2.442 00 GHz (Δ) -7.11 dBm Freq Offset 3 4 4 4 4 6	#Re	s B) MODE	N 1	00 SCL	kHz	Hz				BW	Y			ICTION		500 ms	(1001 pts)	CF Step 1.000000 MHz
8	2 3 4 5 6		1		(Δ)					(Δ)								The Constant
MSG STATUS	8 9 10 11 12																	

Channel 39 (2441MHz)

Channel 78 (2480 MHz)

Agilent Spectrum Ana					
Center Freq 2	50 Ω AC 2.480000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	12:52:03 PM Nov 18, 2013 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide IFGain:Lov 10.00 dBm		Mkr	TYPE MUMUUW DET P NNNNN 1 2.479 00 GHz -9.06 dBm	Auto Tune
-10.0		2			Center Free 2.480000000 GH:
-30.0	m		many		Start Fre 2.475000000 GH
60.0 70.0 80.0	when have the second seco		Wen have theme	nen material and a special state and and a special state of the special sp	Stop Fre 2.485000000 G⊦
Center 2.48000 #Res BW 100 MKR MODE TRC SCL		BW 100 kHz	#Sweep	Span 10.00 MHz 500 ms (1001 pts) cunction value	CF Ste 1.000000 MH Auto Ma
1 N 1 f 2 N 1 f 3 - - - 4 - - - 5 - - - 6 - - - 7 - - 8	2.479 00 GHz (Δ) 2.480 00 GHz	-9.06 dBm (Δ) -9.14 dBm			Freq Offse 0 ⊢
9 10 11 12 MSG			STATUS		

Product	:	Car Radio with BT
Test Item	:	Channel Separation
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

	Frequency	Measurement	Limit	Limit of (2/3)*20dB	
Channel No.	Frequency (MHz)	Level	(1-11-)	Dondwidth (1-11-)	Result
	(MHz)	(kHz)	(kHz)	Bandwidth (kHz)	
00	2402	1000	>25 kHz	933.3	Pass
39	2441	1000	>25 kHz	926.7	Pass
78	2480	1000	>25 kHz	933.3	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

)			
	um Analyzer - Swept							
RL	RF 50 Ω		SENSE:II		ALIGN AUTO		4Nov 18, 2013	Frequency
enter Fi	req 2.402000	000 GHz PNO: Wide G IFGain:Low	Trig: Free Rui #Atten: 20 dB		pe: Log-Pwr	TYP	E 1 2 3 4 5 6 E M WWWWW T P N N N N N	
) dB/div	Ref 10.00 dE	3m			Mkr	2 2.403 -8.1	00 GHz I1 dBm	Auto Tu
.00			1	2				Center Fr
).0).0			marte	marin				2.402000000 G
0.0		Arc			0.0			Start Fr 2.397000000 G
0.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			- mo l	6.0		2.397000000 G
0.0	march	he was				w have		
0.0 <mark>cluster</mark>	Cher war							Stop Fr
0.0							<u></u>	2.407000000 G
	402000 GHz 100 kHz	#VBW	/ 100 kHz		#Sweep	Span 10 500 ms (*	0.00 MHz 1001 pts)	CF St 1.000000 M
R MODE TE		× 2.402 00 GHz	Y -7.92 dBm	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u> M
2 N 1	f (Δ)	2.403 00 GHz (Δ)	-8.11 dBm					
1								Freq Offs
5								0
3								
<u> </u>								
1								
2								
3					STATUS			

Channel 00 (2402MHz)



gilent Spectrum Analyzer - Sw				
RL RF 50 Ω enter Freq 2.4410		Avg Type: Log-Pwr	02:29:03 PM Nov 18, 2013 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
0 dB/div Ref 10.00	in Guinie Gw	Mkr	2 2.442 00 GHz -9.92 dBm	Auto Tur
	1	2		Center Fr 2.441000000 G
0.0	montand	ha		Start Fr 2.436000000 G
0.0			the transmission	Stop Fr 2.446000000 G
enter 2.441000 GHz Res BW 100 kHz R XODE TRC SCL	#VBW 100 kHz	#Sweep	Span 10.00 MHz 500 ms (1001 pts) FUNCTION VALUE	CF St 1.000000 M Auto M
N 1 f (Δ) 2 N 1 f (Δ) 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 9 - - - - 0 - - - -	2.441 00 GHz <u>-9.81 dBm</u> 2.442 00 GHz (Δ) -9.92 dBm			Freq Offs 0
1 2 9		STATUS		

Channel 39 (2441MHz)

Channel 78 (2480 MHz)

Agilent Spectrum Analyzer - Swept SA	
	ALIGNAUTO 02:36:21 PMNov 18, 2013 Avg Type: Log-Pwr TRACE 12 3 4 5 6 TYPE IMWWWW
PN0: Wide Trig: Free Run IFGain:Low #Atten: 20 dB	Mkr1 2.479 00 GHz -12.48 dBm
Log 0.00 -10.0 -20.0	Center Freq 2.480000000 GHz
-30.0	Start Freq 2.475000000 GHz
-60.0	Stop Freq 2.48500000 GHz
Center 2.480000 GHz #Res BW 100 kHz #VBW 100 kHz MKR MODE TRC SCL × Y F	Span 10.00 MHz #Sweep 500 ms (1001 pts) 1.000000 MHz UNCTION FUNCTION
1 N 1 f 2.479 00 GHz -12.48 dBm 2 N 1 f (Δ) 2.480 00 GHz (Δ) -12.42 dBm 3 - - - - - 12.42 dBm 4 - - - - - 12.42 dBm 5 - - - - - - 12.42 dBm 6 - - - - - - 12.42 dBm	Freq Offset
7	
MSG	STATUS

9. Dwell Time

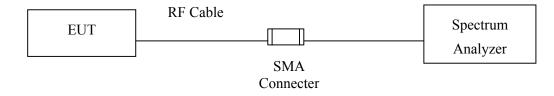
9.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

9.2. Test Setup



9.3. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

9.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.5. Uncertainty

± 25msec

9.6. Test Result of Dwell Time

Product	:	Car Radio with BT
Test Item	:	Dwell Time
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.910	13	50	0.76	0.303	0.4	Pass
2441	2.910	13	50	0.76	0.303	0.4	Pass
2480	2.900	13	50	0.75	0.302	0.4	Pass

Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

CH 00 Time Interval between hops

Rterr 595400 removes and the second Bit III NIO AC Center Freq 2.402000000 GHz Trig: Free Run PNoin Lew Atten: 20 dB Frequency Frequency Avg Type: Log-Pw Avg Type: Log-P TVPT W TYPE Auto Tur Auto Tun Mkr3 6.610 ms -5.80 dBm 10 di Log Ref 10.00 dBr Ref 10.00 dE 0 ² **♦**³ Center Free 2.402000000 GH Center Fre 2.402000000 GH Start Fre Start Fre 2.40200000 G 2.40200000 Gi Stop Free 2.40200000 GH Stop Fre 2.402000000 GH enter 2.402000000 GHz es BW 1.0 MHz Span 0 H Sweep 10.00 ms (1001 pt CF Step 00000 MH Mar CF Step 1.000000 MHz #VBW 1.0 MHz 10 Ma el s N 1 t N 1 t (A) N 1 t 2.960 ms 5.770 ms (Δ) 6.610 ms -5.72 dBn -4.87 dBn -5.90 dBn FreqOffse 0 H Freq Offsel Center 2.402000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 50.00 ms (1001 pts) #VBW 1.0 MHz

CH39 Time Interval between hops

CH 39Transmission Time

			nalyzer - S									<u> </u>									alyzer - S												
Cen			د = 2.441			Ηz		1	SENSE:3V		Avg T	ALI Vpe: L	og-Pwr	12:40	TRACE	lov 18, 201 1 /2 01 4 5	Frequency	Cer			2.441			z	_		NSE:INT	Avg	LIGNAUTO Log-Pwr	18	KACE 1 2 C	45.6	Frequency
					PT IFC	NO: Fas Gainel o	* ~	Trig: Fi #Atten:	20 dB						DEI	12045 PNNNN	Auto Tune						PN IFG	z 0:Fast (ainclow	₽'¦	rig: Free Atten: 20	a Run 0 dB			Mkr3	5.440 5.23 d	ms	Auto Tune
10 de Log	3/div	Re	f 10.00	DdBm													Center Freq 2.441000000 GHz	Log UUU	-		f 10.00	0 dBm	1			Ŷ	•	3		-	.23 d		Center Freq 2.441000000 GHz
10.0 20.0																	Start Freq 2.441000000 GHz	-40.0 -50.0															Start Freq 2.441000000 GHz
30.0 40.0																	Stop Free 2.441000000 GHz	u.u			100000					hije ya	, esc			- In-	⊮ት Span	0. 14 1	Stop Freq 2.441000000 GHz
60.0 90.0								ľ					ſ	,		-	CF Step 1.000000 MHz Auto Men	Res	BW 1	.0 M	Hz	, u nz	×			0 MHz		TUNCTUN	weep 10	0.00 ms		pts)	CF Step 1.000000 MHz Auto Man
/U.U		ų	ų	H	ų		¥	Я,	W.	h	e.		ų	by .	¥	Ņ	Freq Offset	2 3 4	N 1		(A)		4,60	10 ms 10 ms (/ 10 ms	2)	-5.22 df -7.16 df -5.23 df	em Bm Bm		_				Freq Offset 0 Hz
		.4410 1.0 M	00000 1Hz	GHz		#\	/BW	1.0 MH	łz			Sw	reep (50.00 m		an 0 Ha 001 pts		7 9 10 11 12													_		
MSG													STATU	is				MSG											STATUS				

CH 00 Transmission Time

CH 78 Time Interval between hops

CH 78 Transmission Time

	Spectrum															Agiler	nt Spectru	m Ans	alyzer - Sw	upt SA										
	er Fre				0 GH			SE			Avg Type	ALIGNAUTO :: Log-Pwr	115	0 FMNov 18, 2013 ACE 1 2 11 4 5 7	Frequency	Cen			2.48000		GHz		SE		Avg T	ALIGNAUTO		77 FMNby 18 KAUE 1 2 11	45.6	Frequency
					IFG	i0: Fast C aniech ever		rig: Free Atten: 20	dB						Auto Tune						PNO: Fas IFGaind or	* W	Trig: Free #Atten: 20	dB				DEI P N N		Auto Tune
10 dB	(div l	Ref	10.00	dBm											Auto Tune		Bidiv	Ref	f 10.00 (dBm								5.800 8.34 di		Auto Tune
0.00															Center Freq 2.480000000 GHz]	Q ¹			-	2	3				╡	Center Freq 2.48000000 GHz
10.0 20.0															Start Freq 2.480000000 GHz	-30.0 -40.0 -50.0										_			_[Start Freq 2.490000000 GHz
30.0 40.0															Stop Freq 2.480000000 GHz				-					horeford				ittipalites		Stop Freq 2.480000000 GHz
60.0										╢					CF Step 1.000000 MHz Auto Men	Res	BW 1.	O MI		×			I.0 MHz		NOUN	Sweep		Span (s (1001	pts)	CF Step 1.000000 MHz Auto Mar
/0.0	k,		Ų	ų	4	γ		V	ų.	NP	W	H	Ų	կ	Freq Offset	2 3 4	N 1 N 1 N 1				2.050 ms 4.960 ms 5.800 ms	(Δ)	-8.34 de -8.36 de -8.34 de	3m					╡	Freq Offsel 0 Hz
00.0	er 2.48														ĺ	7 8 9 10	+												╡	
	er 2.48 BW 1.0			GHZ		#VB	N 1.	0 MHz			:	Sweep {		Span 0 Hz (1001 pts		11 12														
MSG												STATU	s			MSG										STAT	is.			

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

Product	:	Car Radio with BT
Test Item	:	Dwell Time
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.900	13	50	0.75	0.302	0.4	Pass
2441	2.910	14	50	0.81	0.326	0.4	Pass
2480	2.910	13	50	0.76	0.303	0.4	Pass

Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

CH 00 Time Interval between hops

Center Freq 2.402000000 GHz PN0: Fast C f Cuind ww #Atten: 20 dB ALIGNAUT Avg Type: Log-Pw Frequency Aug Type: Log-Pw Frequency Center Freq 2.4020 00 GHz Trig: Free Run #Atten: 20 dB DEL DEL P N N N Auto Tur Auto Tur Mkr3 5.490 ms -6.73 dBm Ref 10.00 dBm Ref 10.00 dB 10 dE Log .1 Center Free 2.402000000 GH Center Fre Start Fre 2000000 GH Start Fre 2000000 GH 2.40 0.40 e,dddwrd Stop Fre 2000000 GH Stop Fre 2000000 Gi CF Step 1.000000 MHz Man Center 2.402000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 ms (1001 pts) CF Step 1.000000 MH #VBW 1.0 MHz Н 1 <u>1.740 ms</u> 4.640 ms (Δ) -5.74 dB -7.20 dB -5.73 dB ł ų 8 k μ W W ¥ 4 4 Ň Freq Offs Freq Offs 0 H 0 H Center 2.402000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 50.00 ms (1001 pts) #VBW 1.0 MHz

CH39 Time Interval between hops

CH 39Transmission Time

CH 00 Transmission Time

Agilant S																				Agilan	t Spectru																
Cente			50 g 4100		GHz	:			SENS		,	lvg Ty		GNAUTO 29-Pwr		IN	PMNov 1	1450	Frequency	Сеп	iter Fre		2.4410		CH-		_	SENSE:7		Avg Ty	ALIGNA pe: Log-F			IKAUE 1	Y 18, 2013 2014 5 6	Frequenc	;y
10 dB/d	sv R	ef 10).00 d	Bm	PN0 IFGai	ind over	÷	Trig: F #Atten	: 20 d	iB						ì	VIE WWW DEI P NI	INNN	Auto Tune		B/div	Ref	10.00	dBm	PNO: IFGair	Hast G∎ dinwr	Trig: F #Atter	: 20 dB				P	Mkr3	4.72	0 ms dBm	Auto	Tune
UUU																			Center Freq 2.441000000 GHz	Log U.UU		4	1	_	-	{	2	3	-			7				Center 2.44100000	
10.0 20.0																			Start Freq 2.441000000 GHz		1															Start 2.44100000	
30,0 40,0																			Stop Freq 2.441000000 GHz	00.0	Alaka						hahwayo ^d					lyster	للملك		_	Stop 2.44100000	
60.0																			CF Step 1.000000 MHz Auto Men	Res	ter 2.4 BW 1.	D M	Hz	GHZ	970.0		/ 1.0 M		LUNCI		Swee				<u> </u>	CF 1.000000 Auto	
עטי עטי	ų	-	¥	И	V		H	L,		ų	W		v	ų		A	V	H	Freq Offsel	2 3 4	N 1	t	(Δ)		3.890 4.720	ms (Δ)	-9,8	1 dBm 5 dBm 1 dBm		-						FreqO	Offse 0 H
Center Res Bl			000 G	Hz		#VI	BW 1	1.0 MI	Hz				Sw	een	50.0		Span (1001			7 9 10 11 12										+							
MSG													5.	STATE	_		(203	1	MSG											5	TATUS				1	

Autor Statuto (Marco Carlos Ca All CERT Sectors INIO All Inio TRACE 1 2 3 4 5 6 TVPF WWWWWWW Frequency AVg Type: Log-Pwr Frequency Avg Type: Log-Pwr TVPF WWWWWW Auto Tui Auto Tur Mkr3 5.600 ms -11.36 dBm Ref 10.00 dBn Ref 10.00 dBm 10 de Log Center Free 480000000 GH Center Fre 490000000 GH Start Free Start Fre 2.4 Stop Fred 2.480000000 GH: Stop Free TI 2.49 Center 2.480000000 GH; Res BW 1.0 MHz Span 0 Hz Sweep 10.00 ms (1001 pts) CF Step 1.000000 MHz Man CF Step 00000 MH Mar #VBW 1.0 MHz 1.00 1 N 1 t 2 N 1 t (A) 3 N 1 t -11.34 dBm -12.23 dBm -11.36 dBm 4.760 ms 6.600 ms Freq Offse Freq Offsel Span 0 Hz Sweep 50.00 ms (1001 pts) Center 2.4800000 Res BW 1.0 MHz 000 GH2 #VBW 1.0 MHz

CH 78 Time Interval between hops

CH 78 Transmission Time

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

10. Occupied Bandwidth

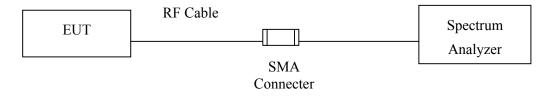
10.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

10.2. Test Setup



10.3. Limits

N/A

10.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.5. Uncertainty

± 150Hz

10.6. Test Result of Occupied Bandwidth

:	Car Radio with BT
:	Occupied Bandwidth Data
:	No.3 OATS
:	Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)
	:

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1130		NA

Figure Channel 00:

Center Freq 2.40200000 GHz Trig: Free Run Avg Type: Leg-Pwr TRACE [1 2 3 4 5 6] Frequency PN0: Wide IFGain:Low Trig: Free Run Mkr2 2.401 39 GHz Auto T 0 dB/div Ref 10.00 dBm -25.24 dBm Auto T 0 dB/div Ref 10.00 dBm -25.24 dBm Center F 0 dB/div Ref 10.00 dBm -24.64 dBm -24.64 dBm 0 dB/div Ref 10.00 dBm -24.64 dBm -24.64 dBm 0 dB/div Ref 10.00 dBm -24.64 dBm -24.64 dBm 0 dB/div Ref 10.00 dBm -24.64 dBm -24.64 dBm 0 dB/div Ref 10.00 dBm -24.64 dBm -24.64 dBm 0 dB/div 1 1 2.401 39 GHz -24.64 dBm 2 N 1 1 2.401 39 GHz -24.64 dBm -24.64 dBm 2 N 1 1 2.401 39 GHz -24.64 dBm -24.64 dBm -24.64 dBm 2 N 1 1 2.401 39 GHz -24.64 dBm -24.64 dBm -24.64 dBm 3 N 1 1 2.401 39 GHz -24.64 dBm -24.64 dBm	RL RF 50 Ω AC		SENSE:INT	ALIGN AUTO	12:06:19 PMNov 18, 2013	
MKr2 2.401 39 GHz -25.24 dBm O dB/div Ref 10.00 dBm -25.24 dBm O dB/div Q -24.84 dBm O dD Q -24.07000000 Start F -2.397000000 Start F -2.407000000 Start F -2.407000000 O dD Function Function violation O dD Function Function violation O dD -2.401 94 GHz -4.64 dBm	enter Freq 2.4020000	PNO: Wide 😱		Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
0.00 1 Center F 0.00 2 3 24.64 dBh 0.00 24.64 dBh 24.64 dBh 524.64 dBh 0.00 2.40200000 30.0 30.0 30.0 0.00 2.464 dBh 3 3 3 0.00 2.464 dBh 3 3 3 3 0.00 3 3 4 4 4 4 5 1				Mkr	2 2.401 39 GHz -25.24 dBm	Auto Tur
10.0 10.0	0.0				-24.84 dBm	Center Fr 2.402000000 G
Image: Section of the sectio	0.0	~~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Start Fr 2.397000000 G
Res BW 100 kHz #VBW 100 kHz Sweep 1.27 ms (1001 pts) CF s 1.000000 Image: State of the sta	0.0 mm mm				y - wy > wyw	Stop Fr 2.407000000 G
1 N 1 f 2.401 94 GHz -4.64 dBm 2 N 1 f 2.401 39 GHz (Δ) -25.24 dBm 3 N 1 f 2.402 52 GHz -24.68 dBm Freq Of 4 Freq Of	Res BW 100 kHz				1.27 ms (1001 pts)	CF Sto 1.000000 M Auto M
3	1 N 1 f 2 2 N 1 f (Δ) 2 3 N 1 f 2 2 4 - - - 2 5 - - - - 6 - - - - 7 - - - - 9 - - - - 9 - - - -	.401 94 GHz .401 39 GHz (Δ)	-4.64 dBm -25.24 dBm			Freq Offs 01

Result NA

Test Site	: Occupied Ban : No.3 OATS	Car Radio with BT Occupied Bandwidth Data No.3 OATS Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)							
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)						
39	2441	1130							

Figure Channel 39:

RL RF 50 Ω	AC	SENSE:INT	ALIGN AUTO	12:36:55 PMNov 18, 2013	
enter Freq 2.44100		7	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
0 dB/div Ref 10.00 d			Mkr	2 2.440 38 GHz -27.05 dBm	Auto Tun
og 0.00 10.0 20.0				-26.01 dBm	Center Fre 2.441000000 GH
30.0 40.0 50.0	m		hand		Start Fre 2.436000000 GH
				manannann	Stop Fr 2.446000000 G
enter 2.441000 GHz Res BW 100 kHz		/ 100 kHz		Span 10.00 MHz 1.27 ms (1001 pts)	CF Sto 1.000000 M
KR MODE TFC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4	× 2.440 95 GHz 2.440 38 GHz (Δ) 2.441 51 GHz	Y FU -6.01 dBm -27.05 dBm -26.06 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	Auto M Freq Offs 0
6 7 8					
9 0 1 2					

Result NA

Test Site	: Occupied Ban : No.3 OATS	Car Radio with BT Occupied Bandwidth Data No.3 OATS Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)							
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)						
78	2480	1140							

Figure Channel 78:

RL	Im Analyzer - Swe	AC		SENS	E:INT		ALIGN AUTO	12:46:03 P	4Nov 18, 2013	
	eq 2.48000	00000 GH	iz IO: Wide 😱 Gain:Low	Trig: Free #Atten: 20	Run	Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6 E MWWWWW T P N N N N N	Frequency
0 dB/div	Ref 10.00 (dBm					Mkr		38 GHz 90 dBm	Auto Tun
°g 0.00 10.0					3					Center Fre 2.480000000 GF
30.0 40.0 50.0		~	-		-V-	Lum			-28.12 dBm	Start Fr 2.475000000 G
0.0	- Amora							www	n gaada ahaa ah	Stop Fr 2.485000000 G
Res BW			#VBW	100 kHz				1.27 ms (CF St 1.000000 M
KR MODE TR 1 N 1 2 N 1 3 N 1	f f (Δ) f	× 2.479 9 2.479 3 2.480 5	8 GHz (Δ)	-8.12 dB -28.90 dB -28.93 dB	m	CHION FU	NCTION WIDTH	FUNCTIO	IN VALUE	Auto M
4 5 6 7										Freq Offs 0
8 9 0 1 2										
					1					

Product Test Item Test Site Test Mode	: Occupied Ban : No.3 OATS	Car Radio with BT Occupied Bandwidth Data No.3 OATS Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)						
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result				
00	2402	1400		NA				

Figure Channel 00:

RL	RF 50 Ω	AC		SENSE:INT		ALIGN AUTO	02:16:59 PM	1Nov 18, 2013	
	req 2.40200	0000 GHz PNO	z : Wide 🖵 in:Low	Trig: Free Run #Atten: 20 dB		: Log-Pwr	TRACE	123456 MWWWWW PNNNNN	Frequency
0 dB/div	Ref 10.00 d	1000000	In:Low	FAtten: 20 4D		Mkr	2 2.401 2	26 GHz 4 dBm	Auto Tun
0 g 0.00				↓ ²	3			-26.60 dBm	Center Fr 2.402000000 GI
80.0 10.0 50.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Jun		har.	and the second	~		Start Fr 2.397000000 G
0.0 0.0 0.0	manna								Stop Fr 2.407000000 G
Res BW	402000 GHz 100 kHz		#VBW	100 kHz			1.27 ms (1		CF St 1.000000 M
KR MODE 11 1 N 1 2 N 1 3 N 1 4 5 6	FC SCL f f (Δ) f	× 2.401 95 2.401 26 2.402 66	GHz (Δ)	-27.39 dBm		ICTION WIDTH	FUNCTIO		Auto M Freq Offs 0
7 8 9 0 1									
2									

Product Test Item Test Site Test Mode	: Occupied Ban : No.3 OATS	Car Radio with BT Occupied Bandwidth Data No.3 OATS Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)							
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result					
39	2441	1390		NA					

Figure Channel 39:

gilent Spectrum Analyzer - Swept S					
RL RF 50 Ω A Center Freq 2.4410000	00 GHz PNO: Wide	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	02:23:48 PM Nov 18, 2013 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
0 dB/div Ref 10.00 dBr	IFGain:Low	#Atten: 20 dB	Mkr	2 2.440 26 GHz -28.62 dBm	Auto Tun
.00 0.00 10.0 20.0		1 2 			Center Fre 2.441000000 G⊢
40.0	~~~~~			-28.54 dBm	Start Fre 2.436000000 GH
70.0 30.0				A.M. Sand and a second	Stop Fr 2.446000000 Gi
enter 2.441000 GHz Res BW 100 kHz		100 kHz		Span 10.00 MHz 1.27 ms (1001 pts)	CF Ste 1.000000 M
1 N 1 f 2 N 1 f (Δ)	× 2.440 95 GHz 2.440 26 GHz (Δ)	-8.54 dBm -28.62 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> M
4 5 6 6	2.441 65 GHz	-29.51 dBm			Freq Offs 0
7 8 9 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
2			STATUS		

Product Test Item Test Site Test Mode	: Occupied Ban : No.3 OATS	Car Radio with BT Occupied Bandwidth Data No.3 OATS Mode 2: Transmit - 3Mbps (8DPSK)(2480MHz)				
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result		
78	2480	1400		NA		

Figure Channel 78:

ilent Spectrum Analyzer - Swept SA RL RF 50Ω AC	SENSE:	NT ALIGN AUTO	02:30:03 PMNov 18, 2013	
enter Freq 2.48000000		Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
Mkr2 2.479 25 GHz 0 dB/div Ref 10.00 dBm -32.56 dBm				
				Center Fre 2.48000000 GH
0.0 0.0	^2	V3	-31.20 dBm	2.48000000 Gi
0.0 0.0				Start Fre 2.475000000 GI
0.0		Jassa man man	all and a second and a second	Stop Fr 2.485000000 G
enter 2.480000 GHz Res BW 100 kHz	#VBW 100 kHz	Sweep	Span 10.00 MHz 1.27 ms (1001 pts)	CF Sto 1.000000 M
	479 96 GHz -11.20 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> M
2 N 1 f (Δ) 2.4 3 N 1 f 2.4 4 - - - - 5 - - - - 5 - - - - -	479 25 GHz (Δ) -32.56 dBm 480 65 GHz -32.23 dBm			Freq Offs 0
7 3 9 0				

11. EMI Reduction Method During Compliance Testing

No modification was made during testing.