

# FCC Test Report

Product Name	Infotainment System with Headunit (with BT, WLAN, Klear technology)
Model No.	NTG5 HU
FCC ID.	T8G9099

Applicant	Harman Becker Automotive Systems GmbH
Address	Becker-Göring-Str. 16, 76307 Karlsbad, Germany

Date of Receipt	Mar, 11, 2013
Issued Date	Mar, 15, 2013
Report No.	133230R-RFUSP29V01
Report Version	V1.0



The Test Results relate only to the samples tested.

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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

# Test Report Certification

Issued Date: Mar, 15, 2013

Report No.: 133230R-RFUSP29V01



Product Name	Infotainment System with Headunit (with BT, WLAN, Klear technology)
Applicant	Harman Becker Automotive Systems GmbH
Address	Becker-Görling-Str. 16, 76307 Karlsbad, Germany
Manufacturer	Harman Becker Automotive Systems GmbH
Model No.	NTG5 HU
FCC ID.	T8G9099
EUT Rated Voltage	DC 12V (Power by vehicle Battery)
EUT Test Voltage	DC 12V (Power by vehicle Battery)
Trade Name	Daimler
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009
Test Result	Complied

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## TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1. EUT Description.....	5
1.2. Operational Description .....	7
1.3. Tested System Details.....	8
1.4. Configuration of Tested System .....	8
1.5. EUT Exercise Software .....	8
1.6. Test Facility .....	10
<b>2. CONDUCTED EMISSION .....</b>	<b>11</b>
2.1. Test Equipment.....	11
2.2. Test Setup .....	11
2.3. Limits .....	12
2.4. Test Procedure .....	12
2.5. Uncertainty .....	12
2.6. Test Result of Conducted Emission.....	13
<b>3. PEAK POWER OUTPUT .....</b>	<b>14</b>
3.1. Test Equipment.....	14
3.2. Test Setup .....	14
3.3. Limit .....	14
3.4. Test Procedure .....	14
3.5. Uncertainty .....	14
3.6. Test Result of Peak Power Output.....	15
<b>4. RADIATED EMISSION .....</b>	<b>17</b>
4.1. Test Equipment.....	17
4.2. Test Setup .....	17
4.3. Limits .....	18
4.4. Test Procedure .....	19
4.5. Uncertainty .....	19
4.6. Test Result of Radiated Emission.....	20
<b>5. RF ANTENNA CONDUCTED TEST .....</b>	<b>28</b>
5.1. Test Equipment.....	28
5.2. Test Setup .....	28
5.3. Limits .....	28
5.4. Test Procedure .....	28
5.5. Uncertainty .....	28
5.6. Test Result of RF Antenna Conducted Test.....	29
<b>6. BAND EDGE .....</b>	<b>41</b>

6.1.	Test Equipment.....	41
6.2.	Test Setup .....	42
6.3.	Limit .....	43
6.4.	Test Procedure .....	43
6.5.	Uncertainty .....	43
6.6.	Test Result of Band Edge .....	44
<b>7.</b>	<b>CHANNEL NUMBER.....</b>	<b>52</b>
7.1.	Test Equipment.....	52
7.2.	Test Setup .....	52
7.3.	Limit .....	52
7.4.	Test Procedure .....	52
7.5.	Uncertainty .....	52
7.6.	Test Result of Channel Number .....	53
<b>8.</b>	<b>CHANNEL SEPARATION.....</b>	<b>55</b>
8.1.	Test Equipment.....	55
8.2.	Test Setup .....	55
8.3.	Limit .....	55
8.4.	Test Procedure .....	55
8.5.	Uncertainty .....	55
8.6.	Test Result of Channel Separation .....	56
<b>9.</b>	<b>DWELL TIME.....</b>	<b>60</b>
9.1.	Test Equipment.....	60
9.2.	Test Setup .....	60
9.3.	Limit .....	60
9.4.	Test Procedure .....	60
9.5.	Uncertainty .....	60
9.6.	Test Result of Dwell Time .....	61
<b>10.</b>	<b>OCCUPIED BANDWIDTH .....</b>	<b>65</b>
10.1.	Test Equipment.....	65
10.2.	Test Setup .....	65
10.3.	Limits .....	65
10.4.	Test Procedure .....	65
10.5.	Uncertainty .....	65
10.6.	Test Result of Occupied Bandwidth .....	66
<b>11.</b>	<b>EMI REDUCTION METHOD DURING COMPLIANCE TESTING .....</b>	<b>72</b>

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Infotainment System with Headunit (with BT, WLAN, Klear technology)
Trade Name	Daimler
Model No.	NTG5 HU
FCC ID.	T8G9099
Frequency Range	2402 – 2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) / $\pi$ /4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	Printed patch antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
FCC Equipment class	DSS

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WISI	AG200	Printed patch antenna	2.4 dBi for 2.4 GHz

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

## Center Frequency of Each Channel:

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		

## Note:

1. The EUT is an Infotainment System with Headunit (with BT, WLAN, Klear technology) with a built-in WLAN 、Bluetooth and Klear transceiver, this report for Bluetooth.
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. After pre-check the following worst case test modes has been selected: 1 Mbps and 3 Mbps.
4. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK) Mode 2: Transmit - 3Mbps (8DPSK)
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## 1.2. Operational Description

The EUT is an Infotainment System with Headunit (with BT, WLAN, Klear technology) with built-in 2.4GHz Bluetooth 3.0+HS and V2.1+EDR transceiver. The number of the channels is 79 in 2402-2480MHz. The device adapts the frequency hopping spread spectrum modulation. The antenna is Printed patch 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.

The EUT “Infotainment System with Headunit (with BT, WLAN, Klear technology)” is based on new low power Intel e-Module technology for a high performance infotainment system, This system will be installed in the new S-Class (W222) of Mercedes Benz and one year later in the new C-Class (W205). It contains features like navigation, different Tuner technologies, CD/DVD-Drive, HDD-Drive, RSC (Rear-Seat-Communication), Bluetooth, WLAN and Klear wireless technology. It was designed for use within different car series for different target markets.

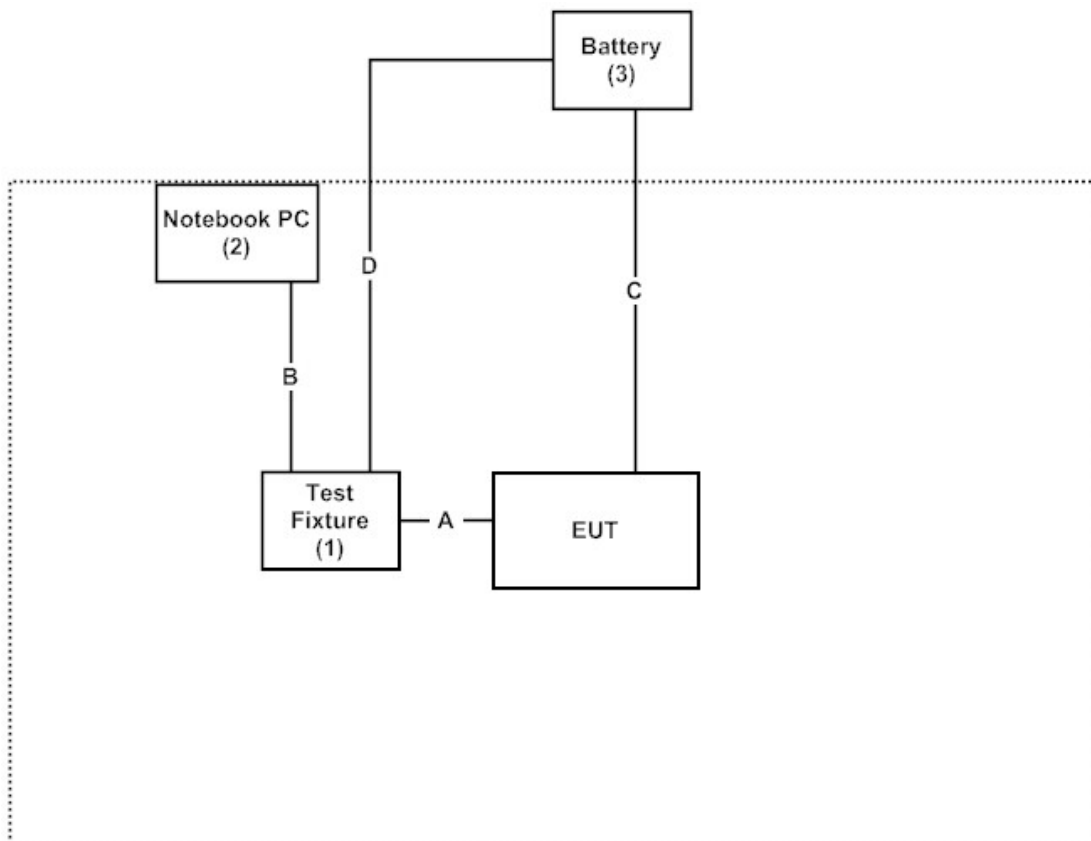
### 1.3. Tested System Details

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

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Test Fixture	Harman Becker	N/A	N/A	N/A
2	Notebook PC	Lenovo	T400	L3AZW4N	N/A
3	DC 12V Battery	TRANE	12B50PE	N/A	N/A

Signal Cable Type	Signal cable Description
A	Signal Cable
B	USB Cable
C	Power Cable
D	Power Cable

### 1.4. Configuration of Tested System





## 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4
- (2) Execute Software “PBluetooth v1.0.5.0” on the notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Start the continuous transmission.
- (5) Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

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

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site: <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site: <http://www.quietek.com/>

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

Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation  
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FCC Accreditation Number: TW1014

## 2. Conducted Emission

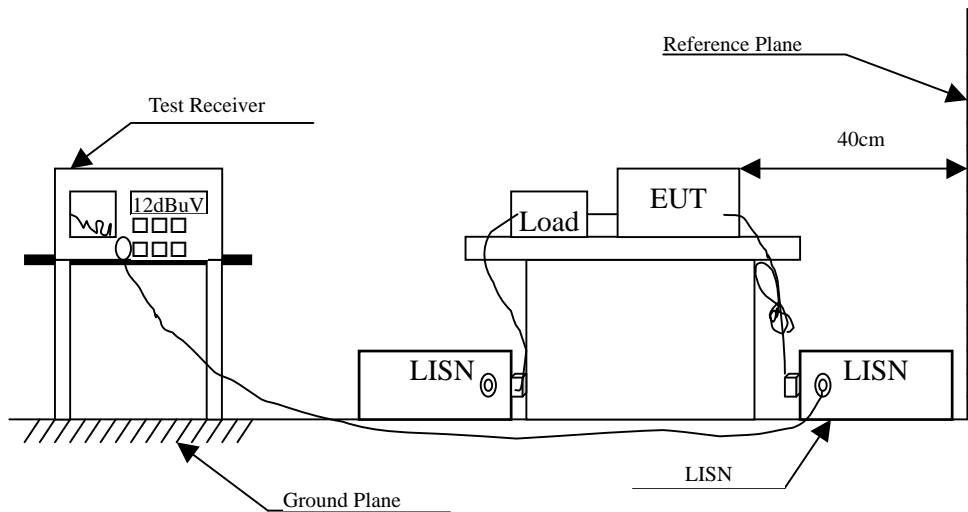
### 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2012	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2013	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2013	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2013	EUT
X	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



**2.3. Limits**

<b>FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit</b>		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

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 investigated 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 EUT use battery supply voltage, this test item is not performed.

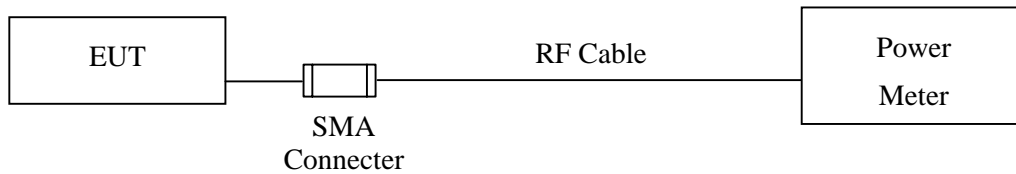
**3. Peak Power Output**

**3.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2012
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2012

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**

± 1.27 dB

### 3.6. Test Result of Peak Power Output

Product : Infotainment System with Headunit (with BT, WLAN, Kler technology)  
Test Item : Peak Power Output  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	-6.14	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-5.94	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-6.19	1 Watt= 30 dBm	Pass

Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
Test Item : Peak Power Output  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	-8.05	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-7.79	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-8.01	1 Watt= 30 dBm	Pass



#### 4. Radiated Emission

##### 4.1. Test Equipment

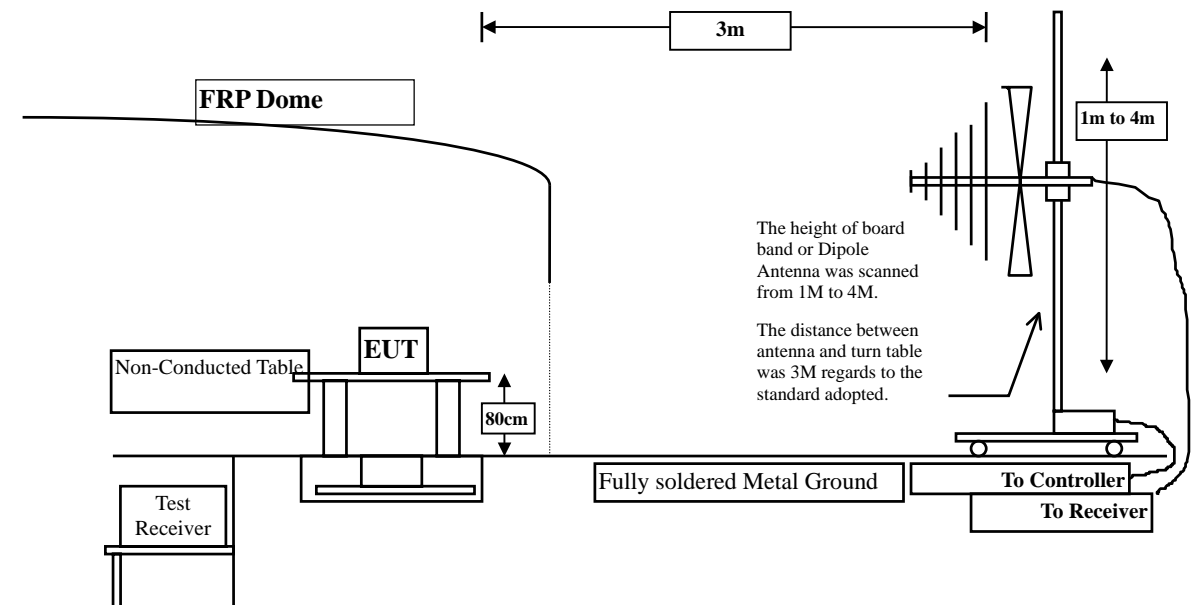
The following test equipments are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2012
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2012
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2012
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2012
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2012
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

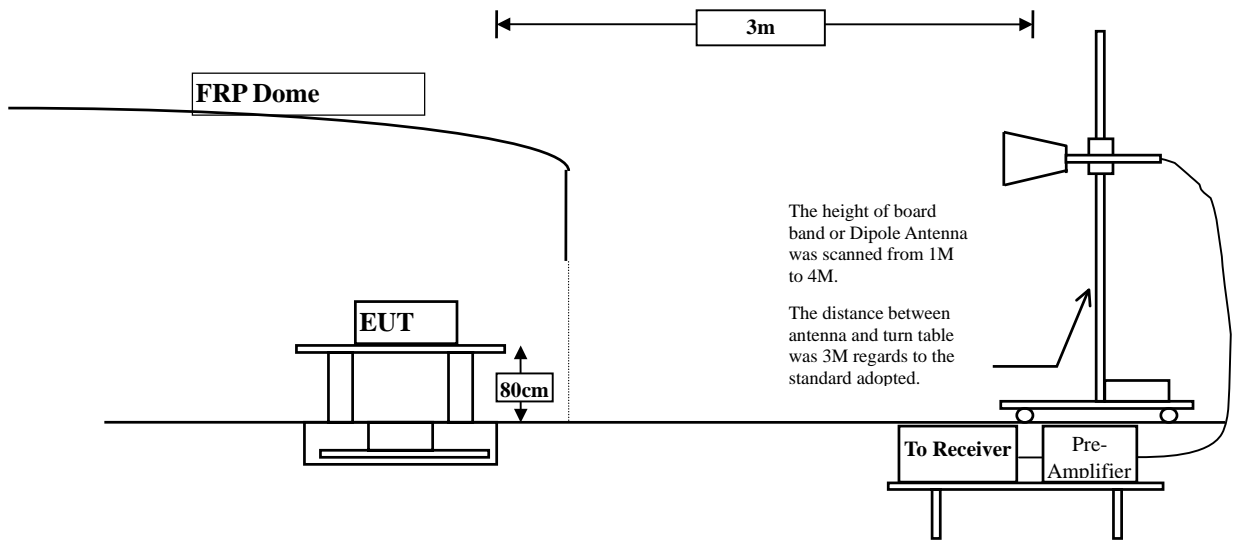
- Note: 1. All equipments are calibrated every one year.  
 2. The test instruments marked by "X" are used to measure the final test results.

##### 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	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- 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 30MHz - 10th Harmonic of fundamental was investigated.

#### 4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

#### 4.6. Test Result of Radiated Emission

Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	3.327	38.310	41.637	-32.363	74.000
7206.000	10.136	38.060	48.196	-25.804	74.000
9608.000	13.706	37.080	50.786	-23.214	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	6.638	38.730	45.367	-28.633	74.000
7206.000	11.005	37.220	48.225	-25.775	74.000
9608.000	14.103	37.450	51.553	-22.447	74.000
<b>Average Detector:</b>					
--					

Note:

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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4882.000	3.001	38.140	41.141	-32.859	74.000
7323.000	11.846	36.470	48.317	-25.683	74.000
9764.000	12.563	38.010	50.573	-23.427	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4882.000	5.713	38.040	43.754	-30.246	74.000
7323.000	12.727	36.900	49.628	-24.372	74.000
9764.000	13.028	37.800	50.828	-23.172	74.000
<b>Average Detector:</b>					
--					

Note:

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

Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	2.760	38.170	40.930	-33.070	74.000
7440.000	12.567	35.710	48.276	-25.724	74.000
9920.000	13.456	36.160	49.616	-24.384	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	5.557	37.900	43.457	-30.543	74.000
7440.000	13.426	35.860	49.285	-24.715	74.000
9920.000	13.958	36.890	50.848	-23.152	74.000
<b>Average Detector:</b>					
--					

Note:

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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	3.327	38.910	42.237	-31.763	74.000
7206.000	10.136	37.540	47.676	-26.324	74.000
9608.000	13.706	37.310	51.016	-22.984	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	6.638	38.470	45.107	-28.893	74.000
7206.000	11.005	37.750	48.755	-25.245	74.000
9608.000	14.103	37.580	51.683	-22.317	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4882.000	3.001	38.170	41.171	-32.829	74.000
7323.000	11.846	36.060	47.907	-26.093	74.000
9764.000	12.563	37.600	50.163	-23.837	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4882.000	5.713	38.260	43.974	-30.026	74.000
7323.000	12.727	36.520	49.248	-24.752	74.000
9764.000	13.028	37.280	50.308	-23.692	74.000
<b>Average Detector:</b>					
--					

Note:

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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	2.760	38.580	41.340	-32.660	74.000
7440.000	12.567	35.920	48.486	-25.514	74.000
9920.000	13.456	36.500	49.956	-24.044	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	5.557	38.040	43.597	-30.403	74.000
7440.000	13.426	35.410	48.835	-25.165	74.000
9920.000	13.958	36.920	50.878	-23.122	74.000
<b>Average Detector:</b>					
--					

Note:

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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
344.280	-2.591	44.270	41.680	-4.320	46.000
431.580	-2.099	45.099	43.000	-3.000	46.000
563.500	1.555	40.582	42.137	-3.863	46.000
648.860	2.038	40.413	42.451	-3.549	46.000
792.420	5.209	37.445	42.654	-3.346	46.000
848.680	5.776	37.987	43.762	-2.238	46.000
<b>Vertical</b>					
270.560	-9.247	43.932	34.685	-11.315	46.000
365.620	-2.179	42.390	40.211	-5.789	46.000
499.480	-0.852	42.734	41.882	-4.118	46.000
623.640	-2.631	38.250	35.619	-10.381	46.000
697.360	1.311	38.270	39.581	-6.419	46.000
769.140	2.923	39.029	41.952	-4.048	46.000

Note:

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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
262.800	-5.013	47.482	42.469	-3.531	46.000
363.680	-1.433	44.528	43.095	-2.905	46.000
516.940	1.654	40.496	42.150	-3.850	46.000
610.060	4.101	39.688	43.789	-2.211	46.000
718.700	3.537	38.776	42.313	-3.687	46.000
827.340	6.302	36.695	42.997	-3.003	46.000
<b>Vertical</b>					
299.660	-6.855	47.494	40.639	-5.361	46.000
381.140	-1.558	40.804	39.246	-6.754	46.000
542.160	-0.269	42.379	42.110	-3.890	46.000
693.480	2.168	38.396	40.564	-5.436	46.000
807.940	3.586	34.811	38.396	-7.604	46.000
899.120	3.063	39.785	42.848	-3.152	46.000

Note:

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.

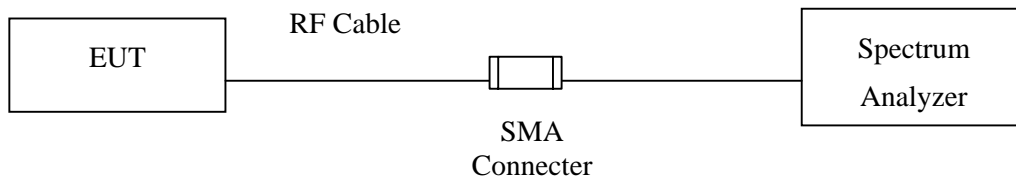
**5. RF Antenna Conducted Test**

**5.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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.

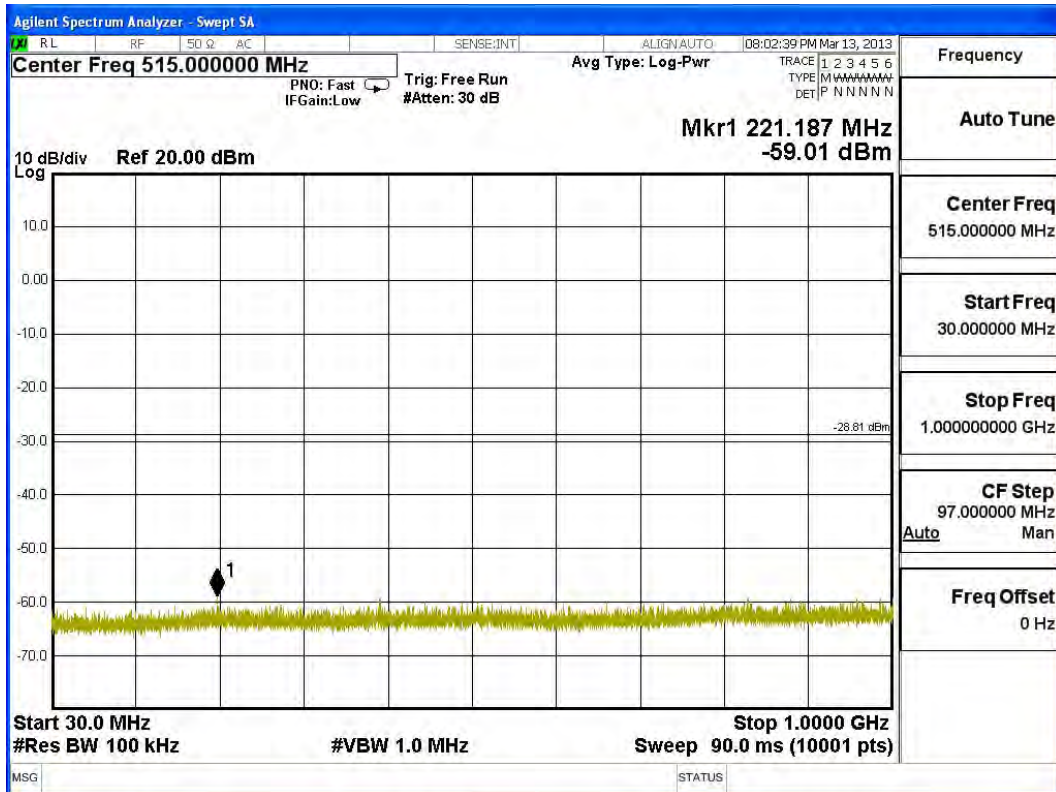
**5.5. Uncertainty**

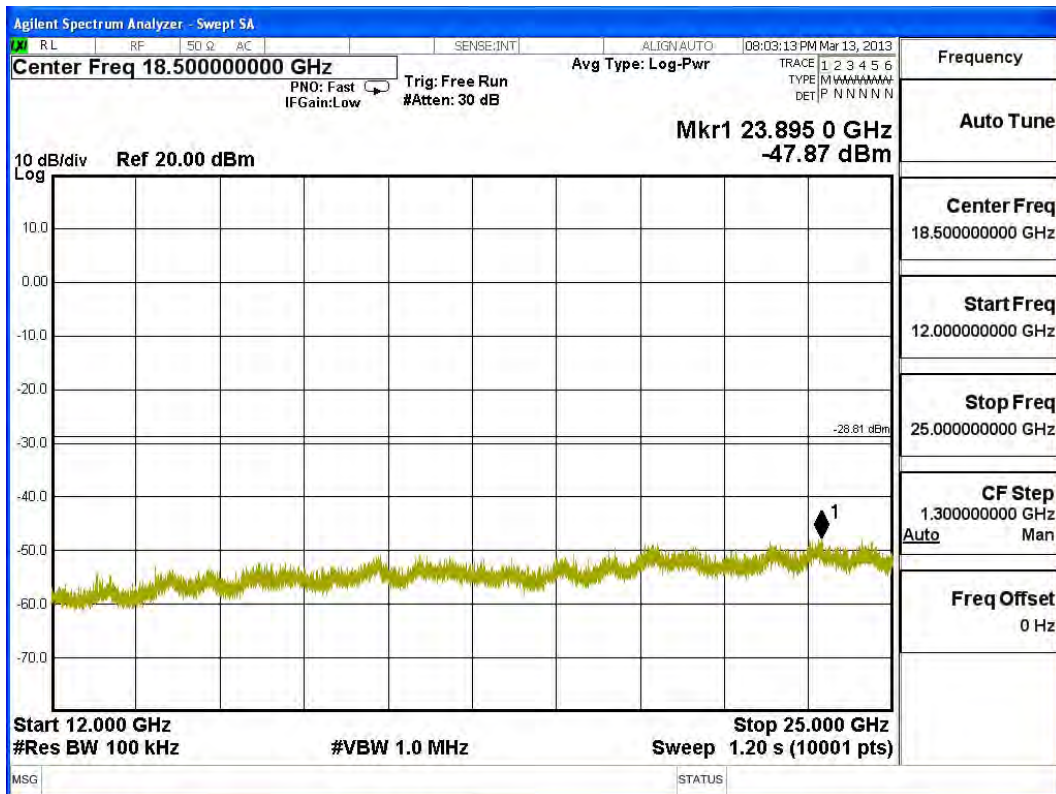
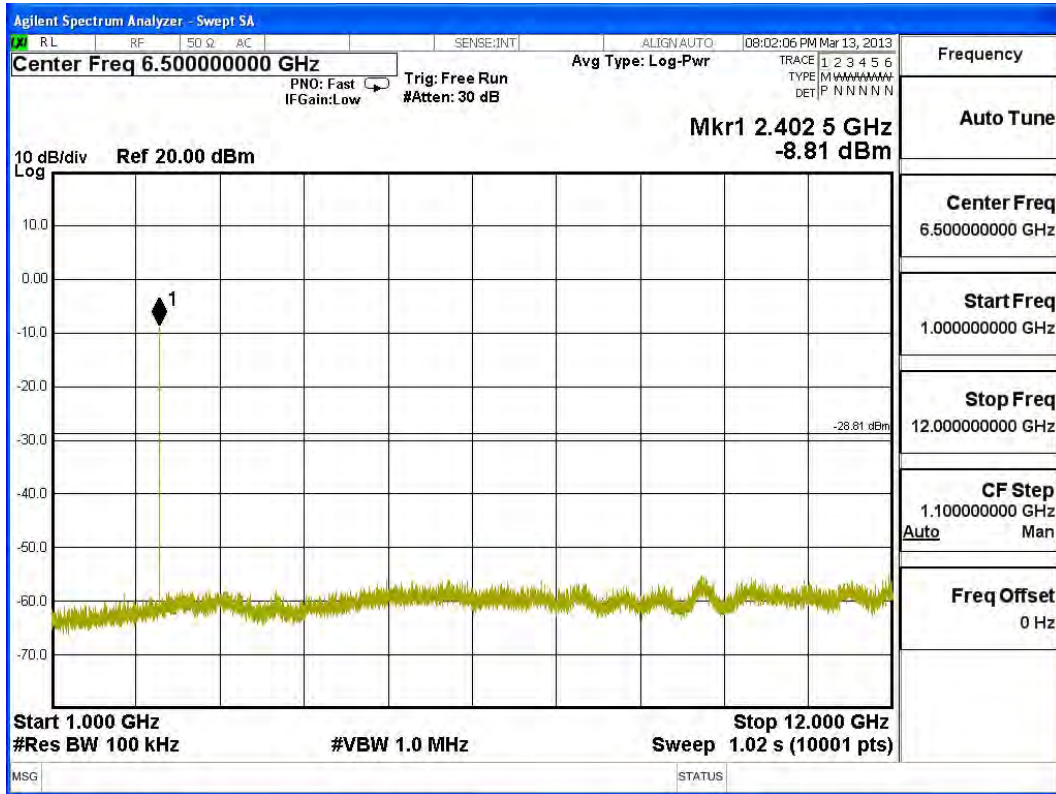
± 150Hz

**5.6. Test Result of RF Antenna Conducted Test**

Product : Infotainment System with Headunit (with BT, WLAN, Kler technology)  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

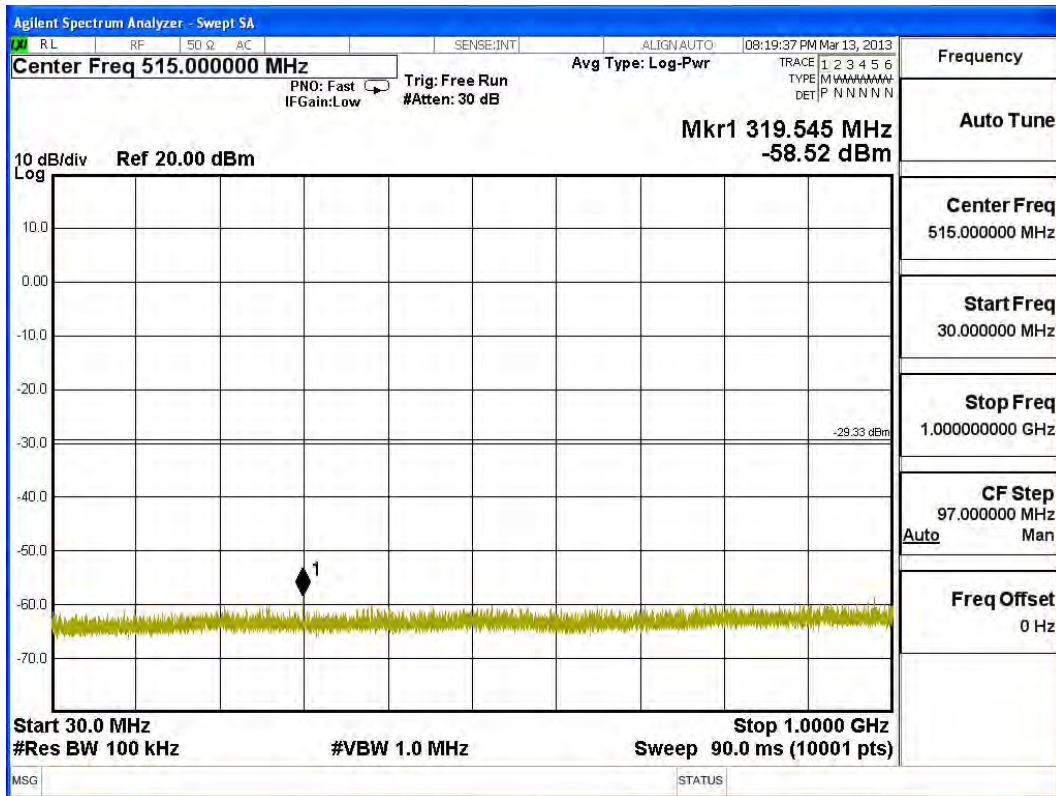
**Figure Channel 00:**

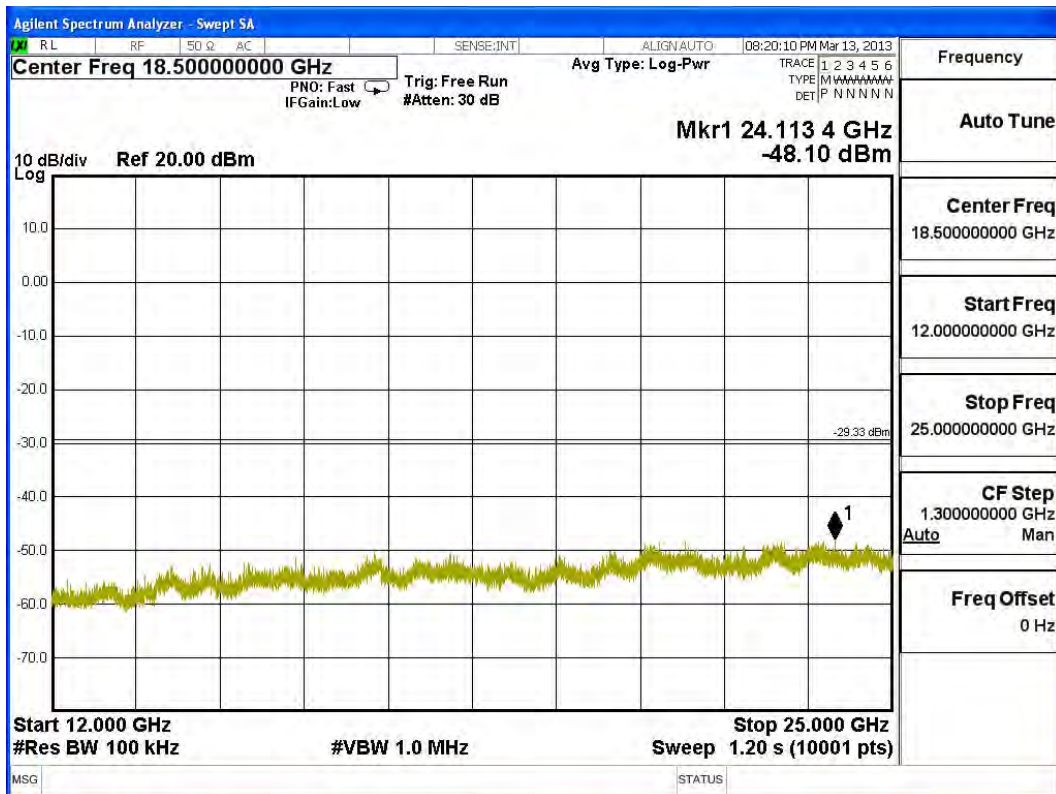
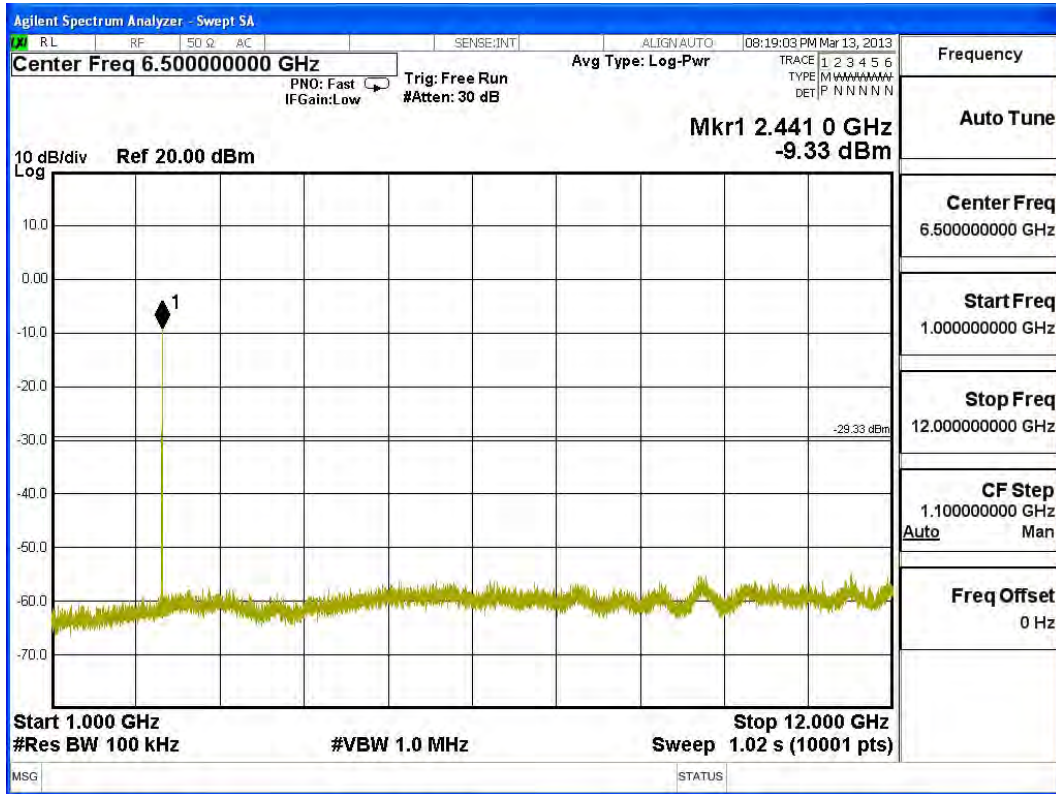




Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

**Figure Channel 39:**

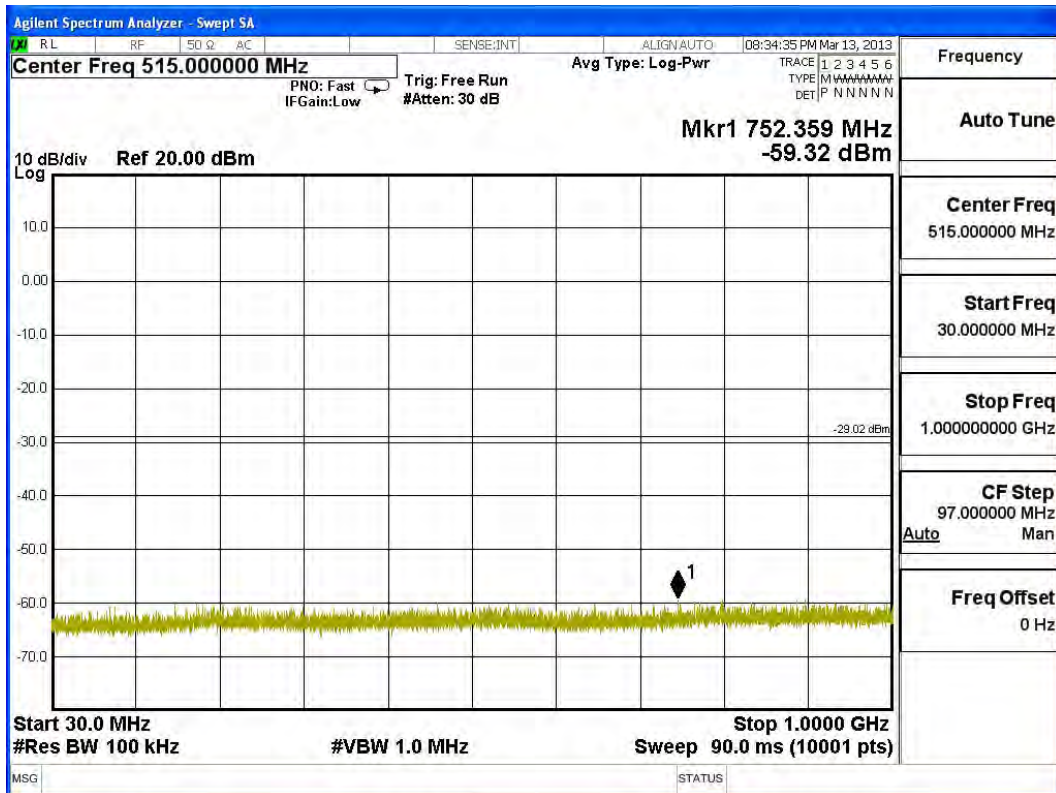


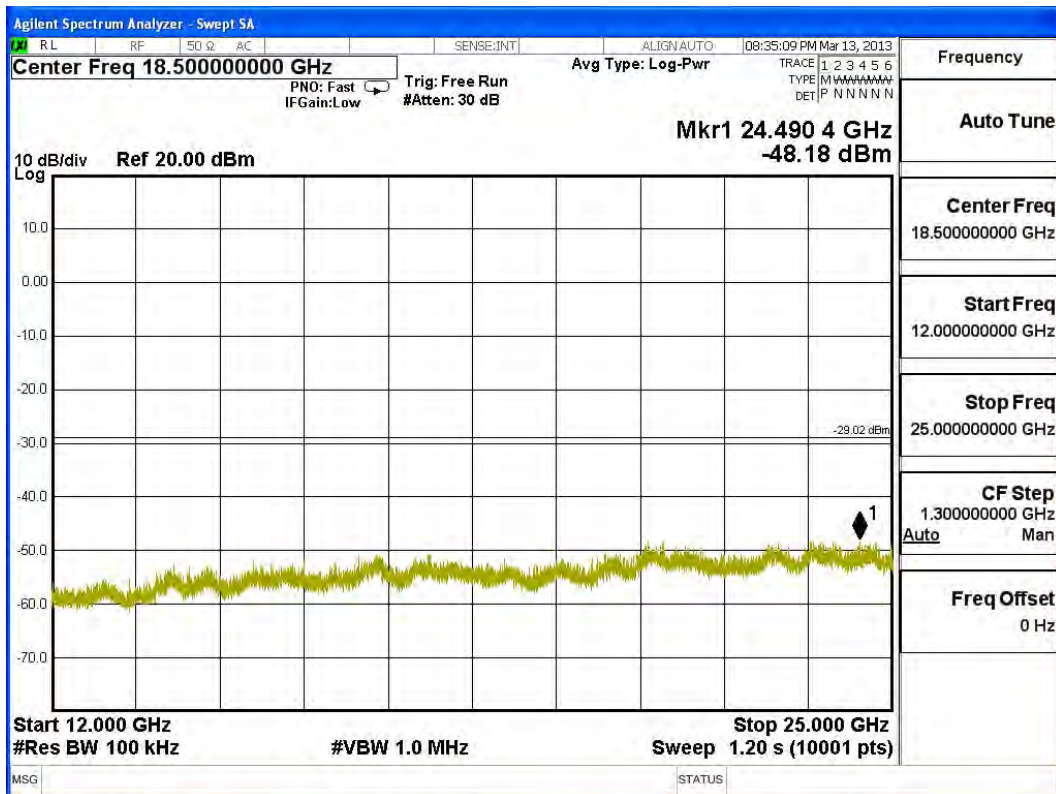
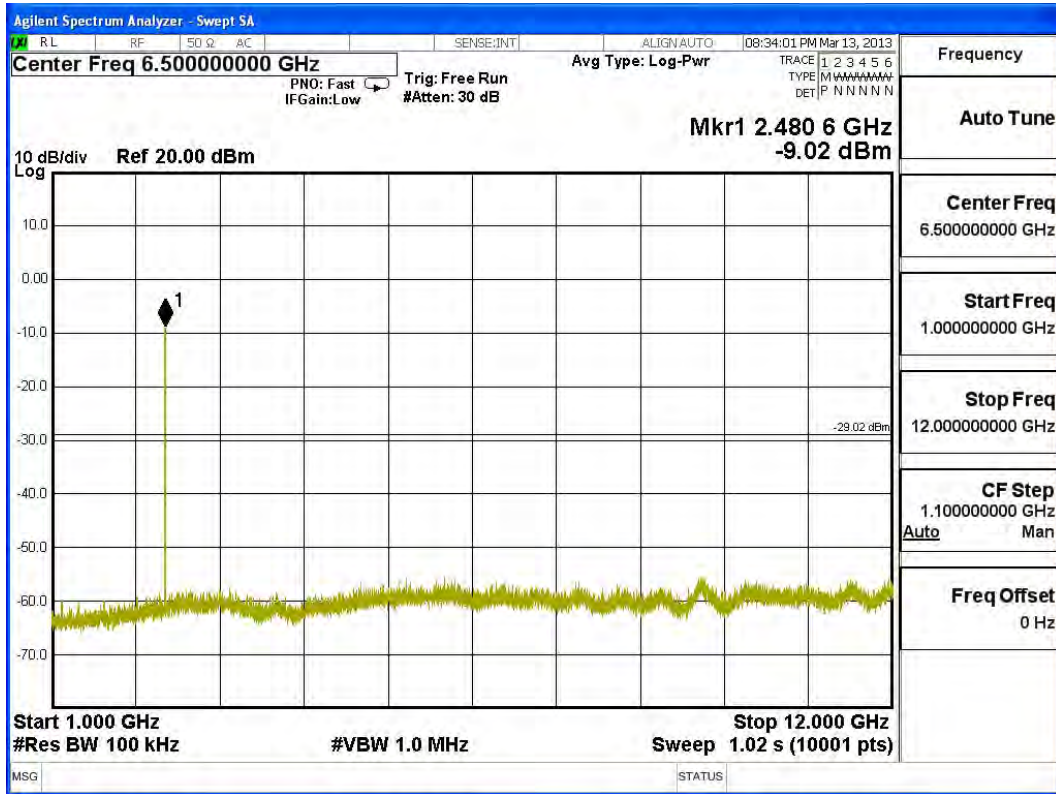




Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

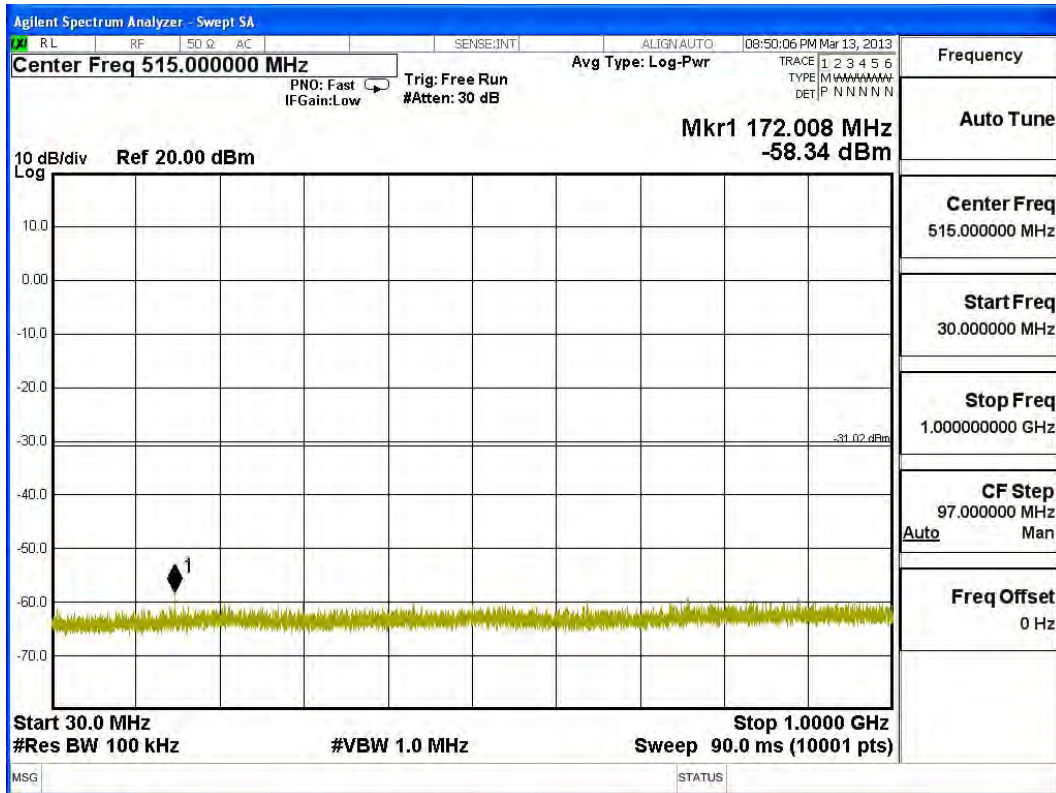
**Figure Channel 78:**

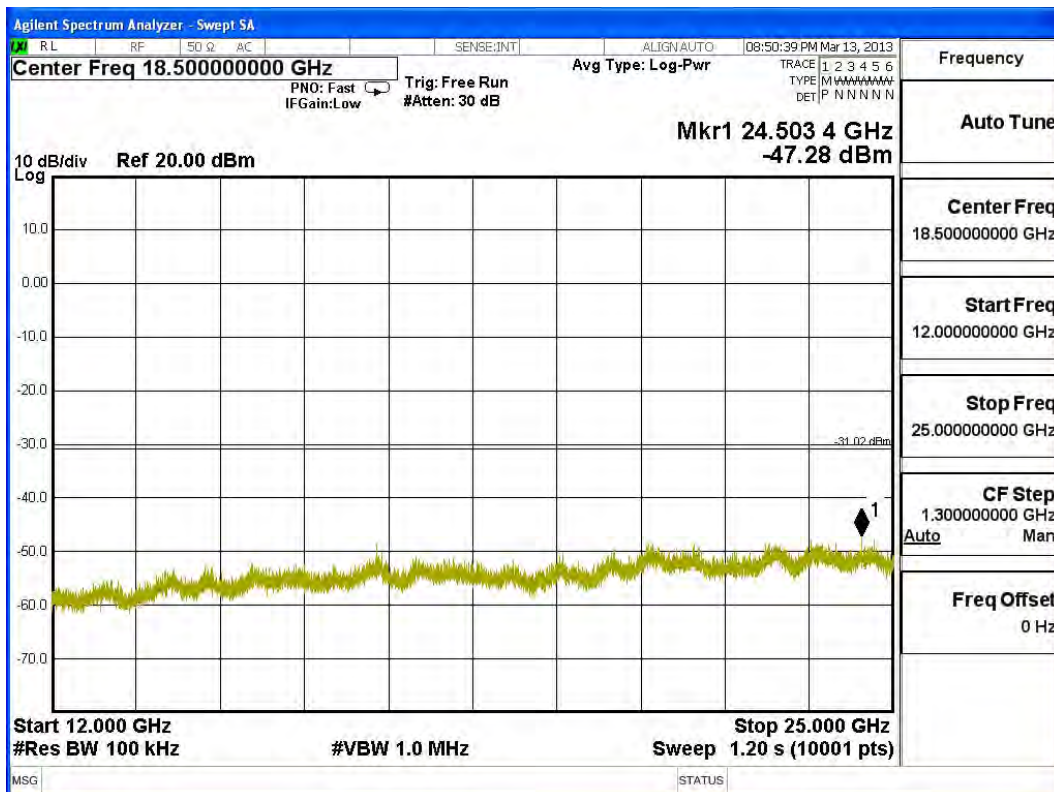
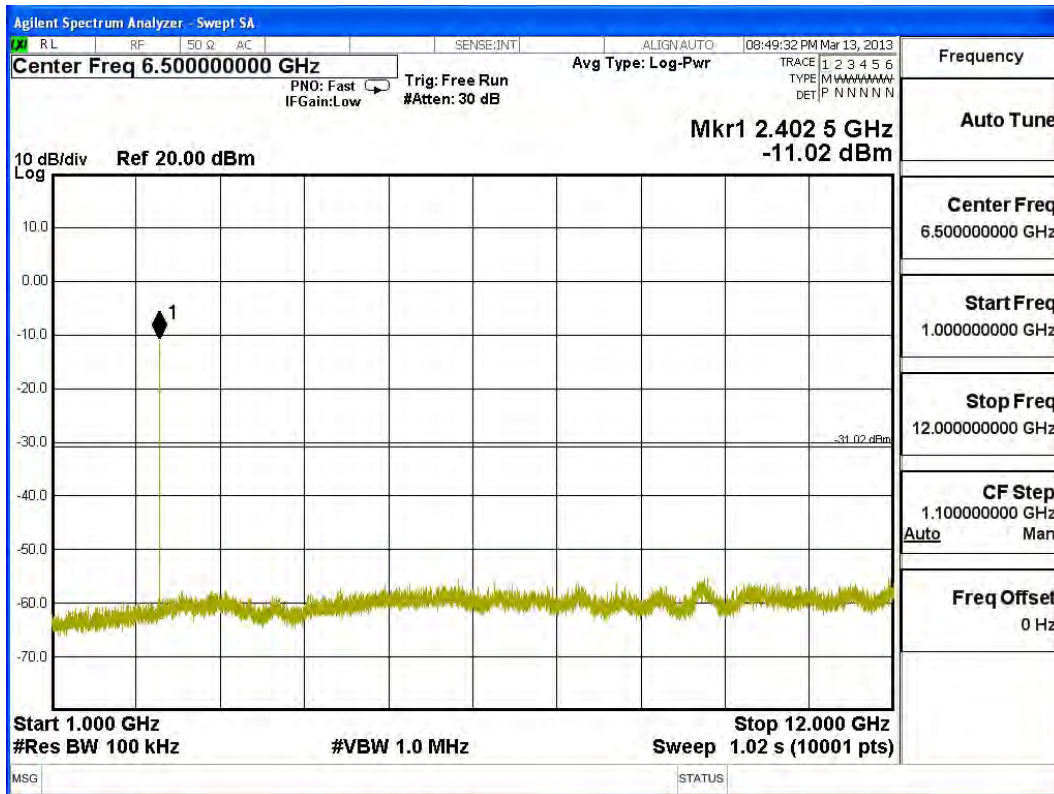




Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

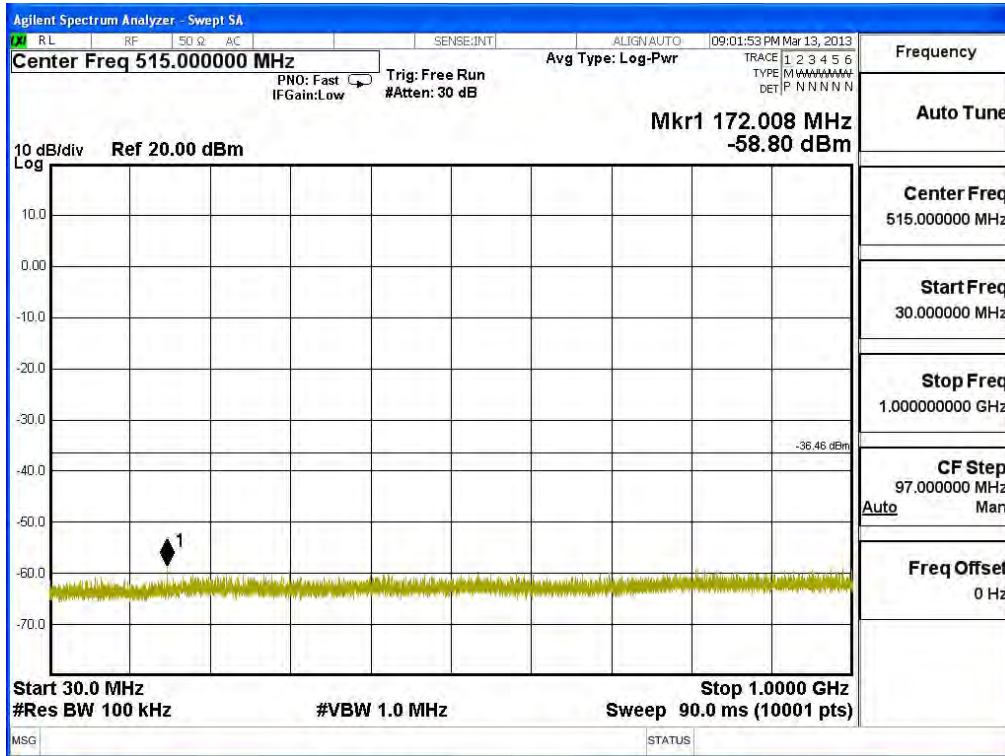
**Figure Channel 00:**

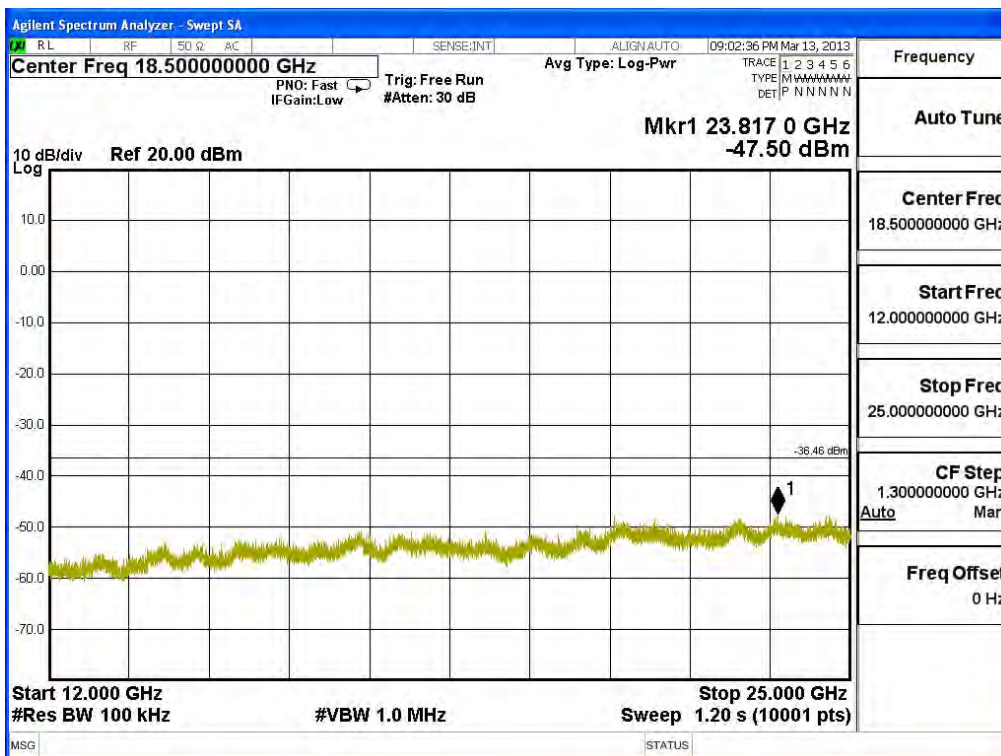
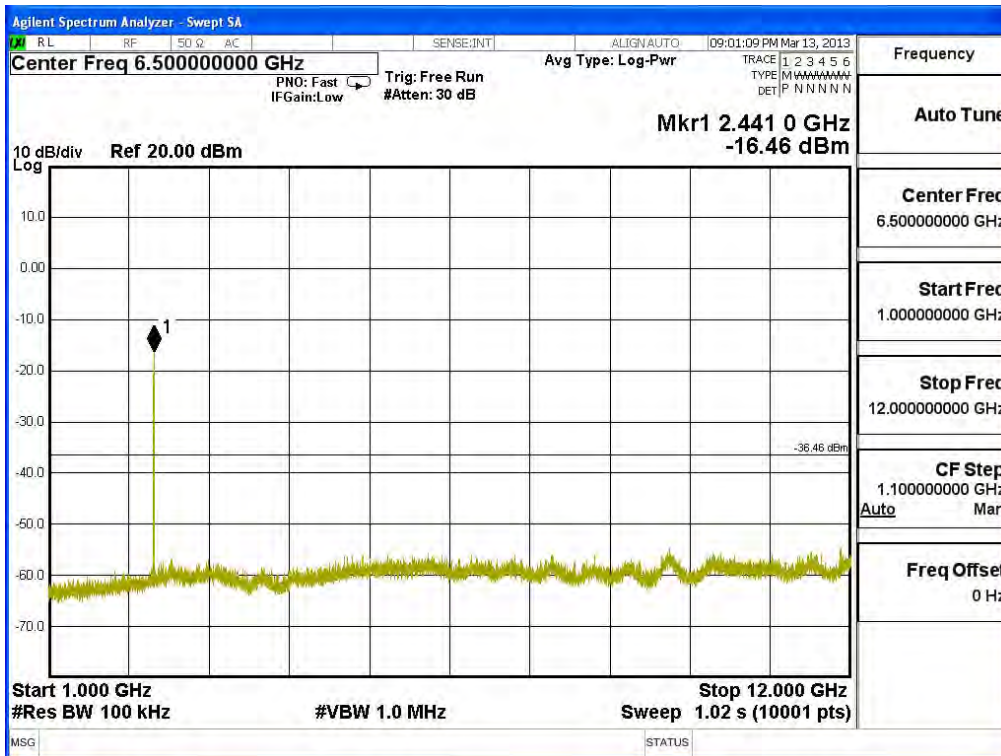




Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

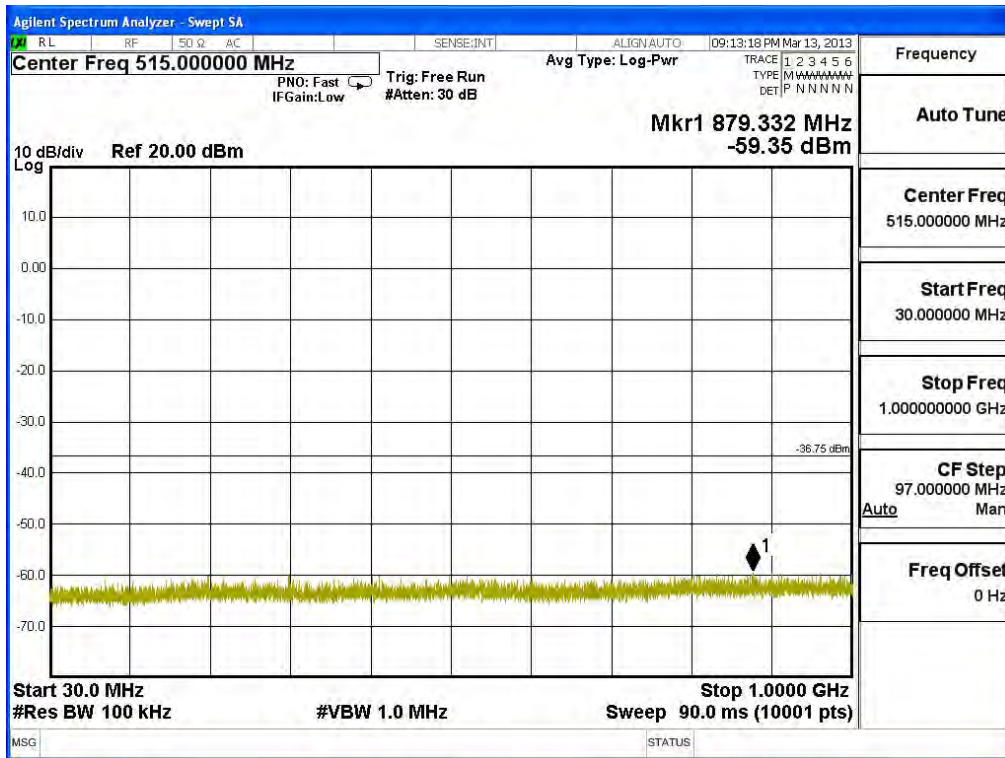
Figure Channel 39:

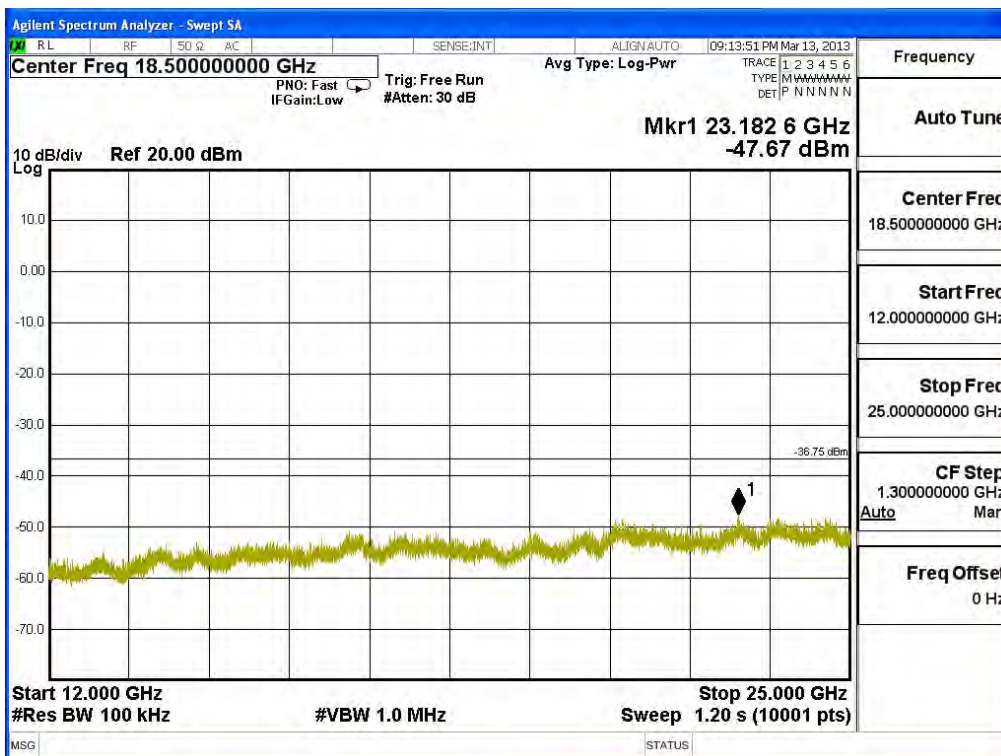
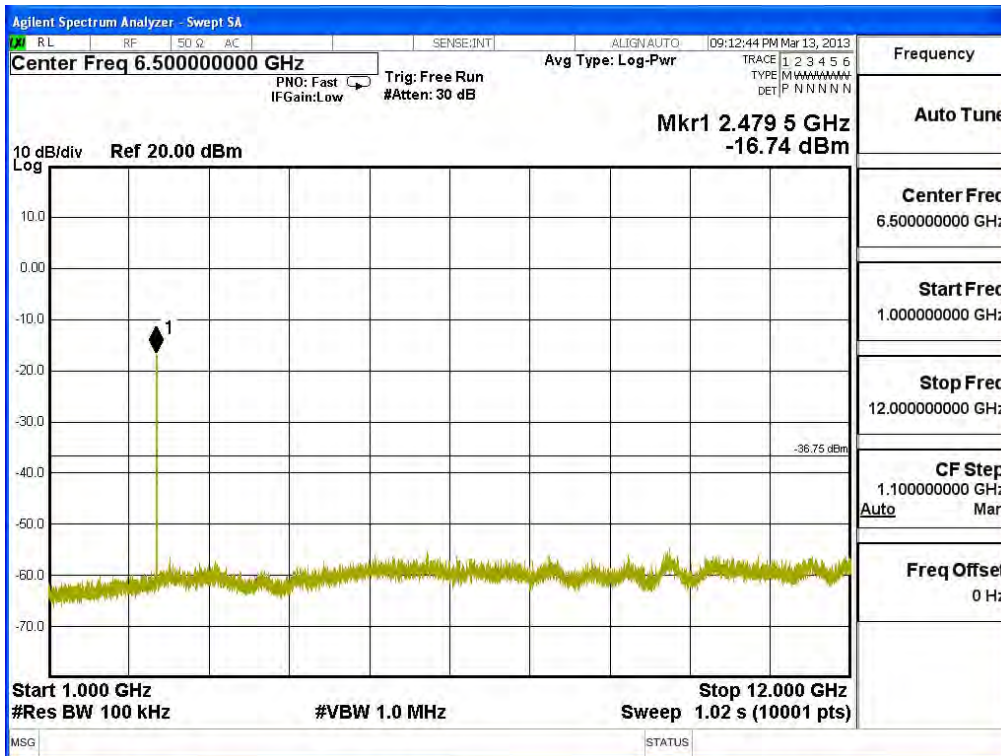




Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

**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, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

#### RF Radiated Measurement:

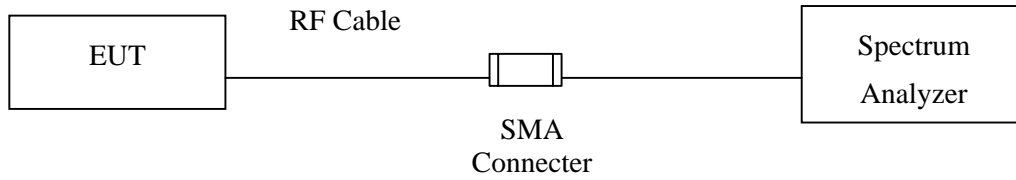
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2012
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2012
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2012
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2012
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2012
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	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.

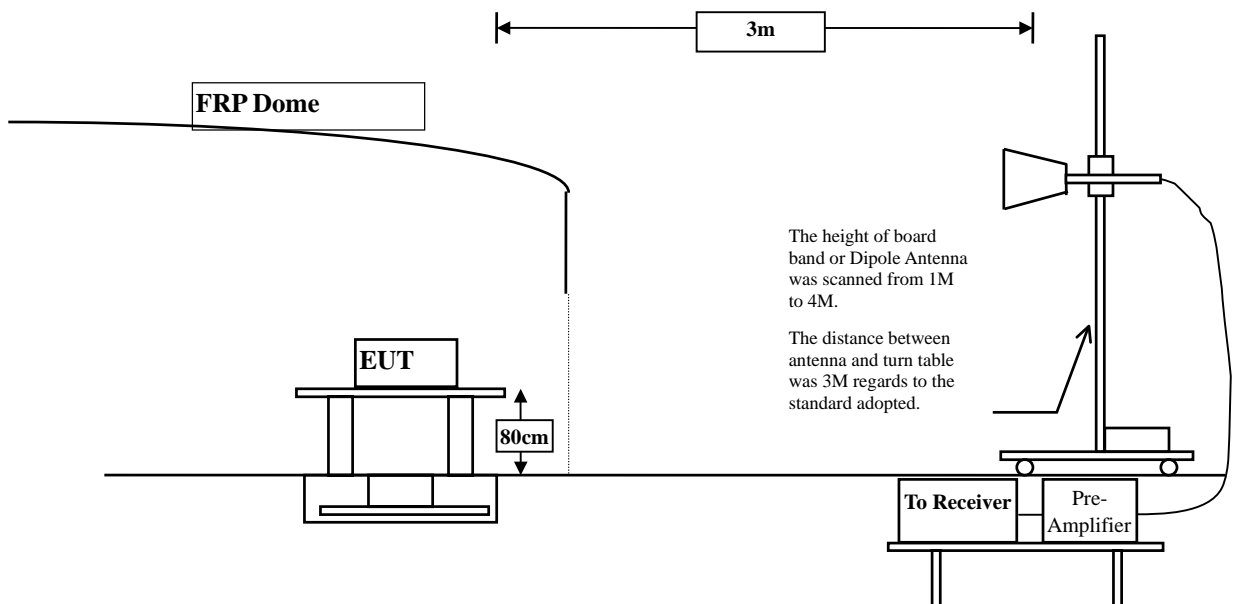
## 6.2. Test Setup

### 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 C63.4:2003 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 : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 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	31.573	53.32	84.894	Peak
Horizontal	2402	31.573	43.4	74.974	Average
Vertical	2402	30.917	48.21	79.127	Peak
Vertical	2402	30.917	39.68	70.597	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)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2370.6	84.894	41.57	43.324	74.000	Peak
Horizontal	2389.1	74.974	43.45	31.524	54.000	Average
Vertical	2370.6	79.127	41.57	37.557	74.000	Peak
Vertical	2389.1	70.597	43.45	27.147	54.000	Average

Note:

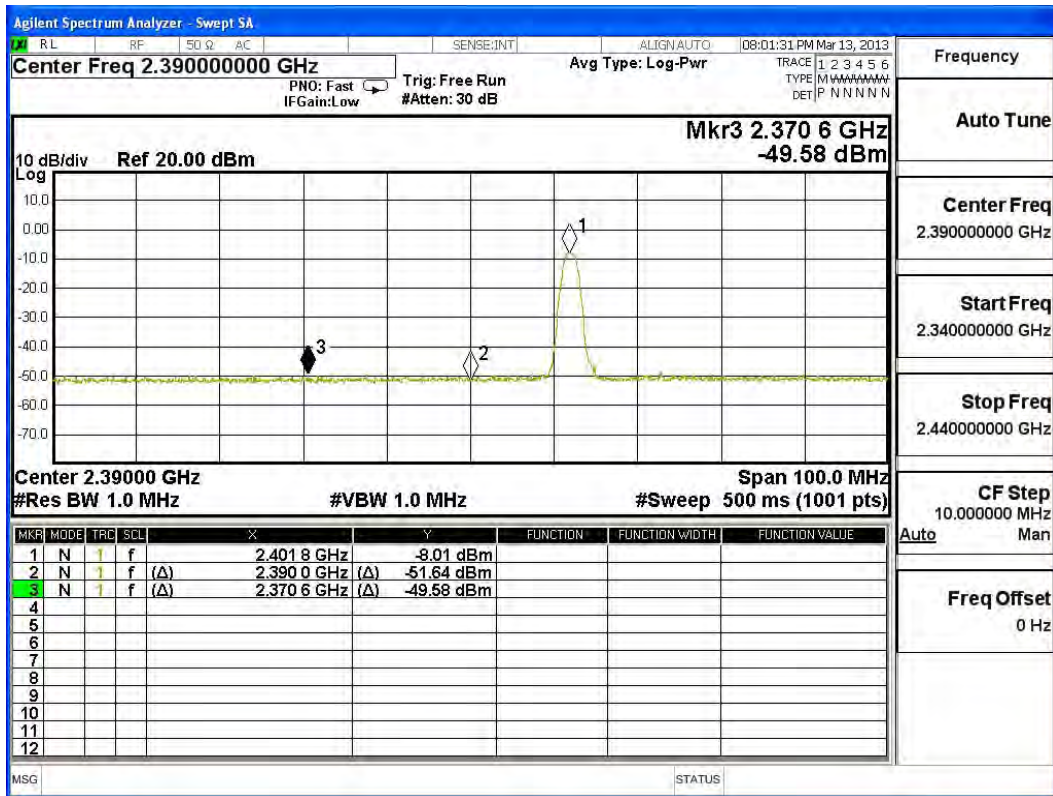
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

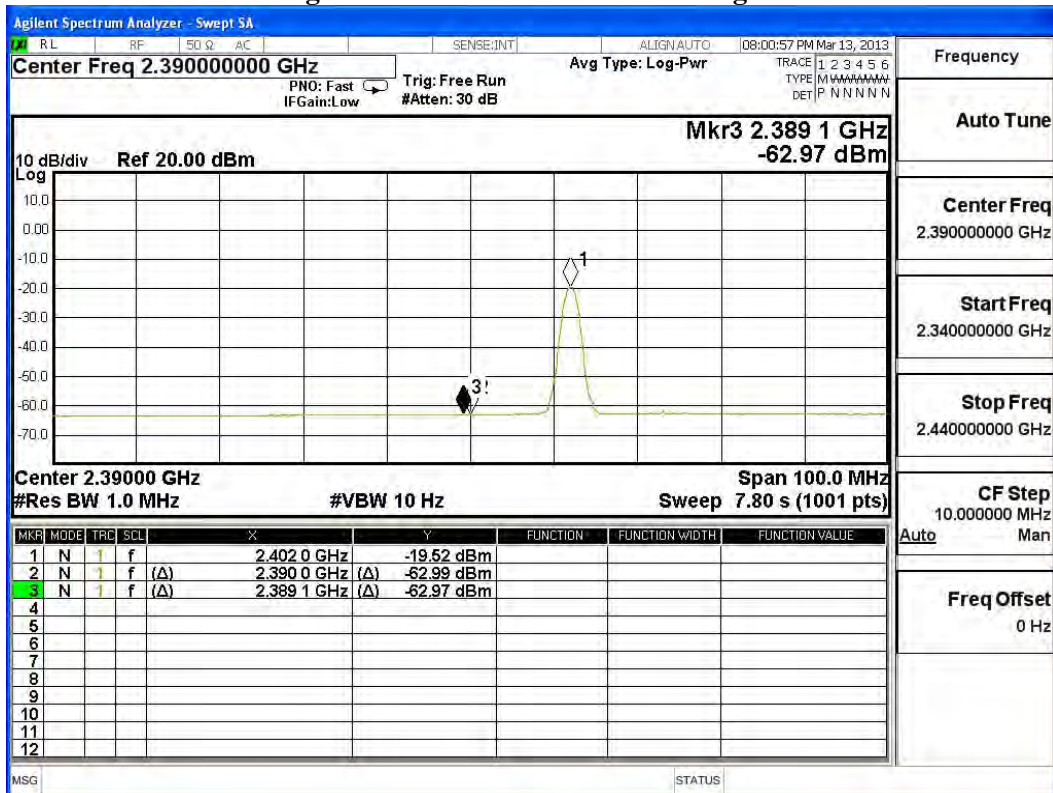
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 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 [dB(uV/m)]	Detector
Horizontal	2480	32.155	52.98	85.136	Peak
Horizontal	2480	32.155	43.18	75.336	Average
Vertical	2480	31.412	49.85	81.262	Peak
Vertical	2480	31.412	40.93	72.342	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)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2497	85.136	39.77	45.366	74.000	Peak
Horizontal	2483.5	75.336	42.74	32.596	54.000	Average
Vertical	2497	81.262	39.77	41.492	74.000	Peak
Vertical	2483.5	72.342	42.74	29.602	54.000	Average

Note:

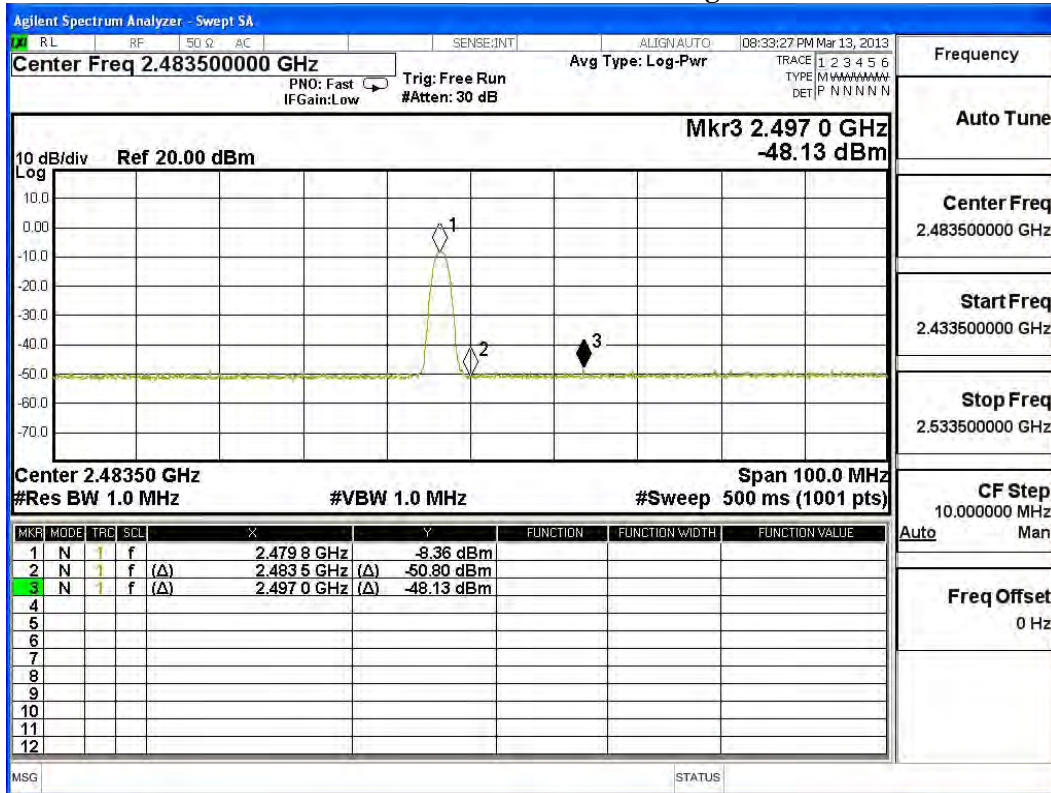
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength =  $F - \Delta$

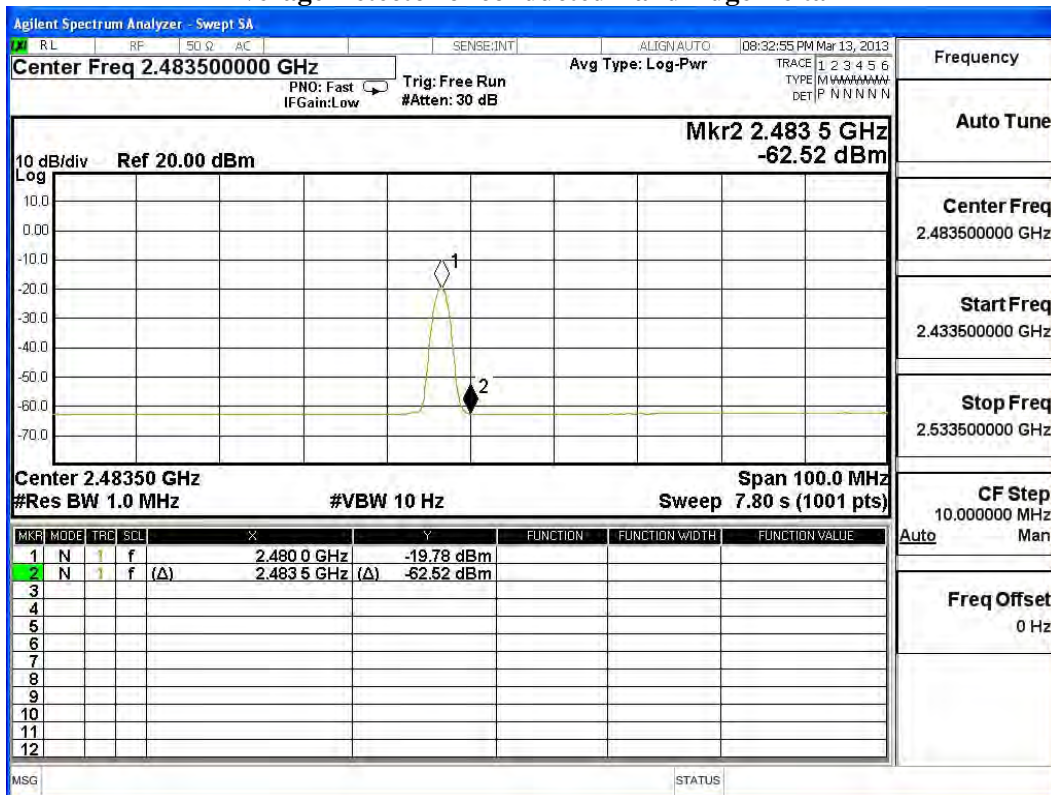
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 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 [dBuV/m]	Detector
Horizontal	2402	31.573	51.64	83.214	Peak
Horizontal	2402	31.573	38.55	70.124	Average
Vertical	2402	30.917	46.21	77.127	Peak
Vertical	2402	30.917	34.39	65.307	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)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2376.7	83.214	39.02	44.194	74.000	Peak
Horizontal	2388.6	70.124	38.05	32.074	54.000	Average
Vertical	2376.7	77.127	39.02	38.107	74.000	Peak
Vertical	2388.6	65.307	38.05	27.257	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:

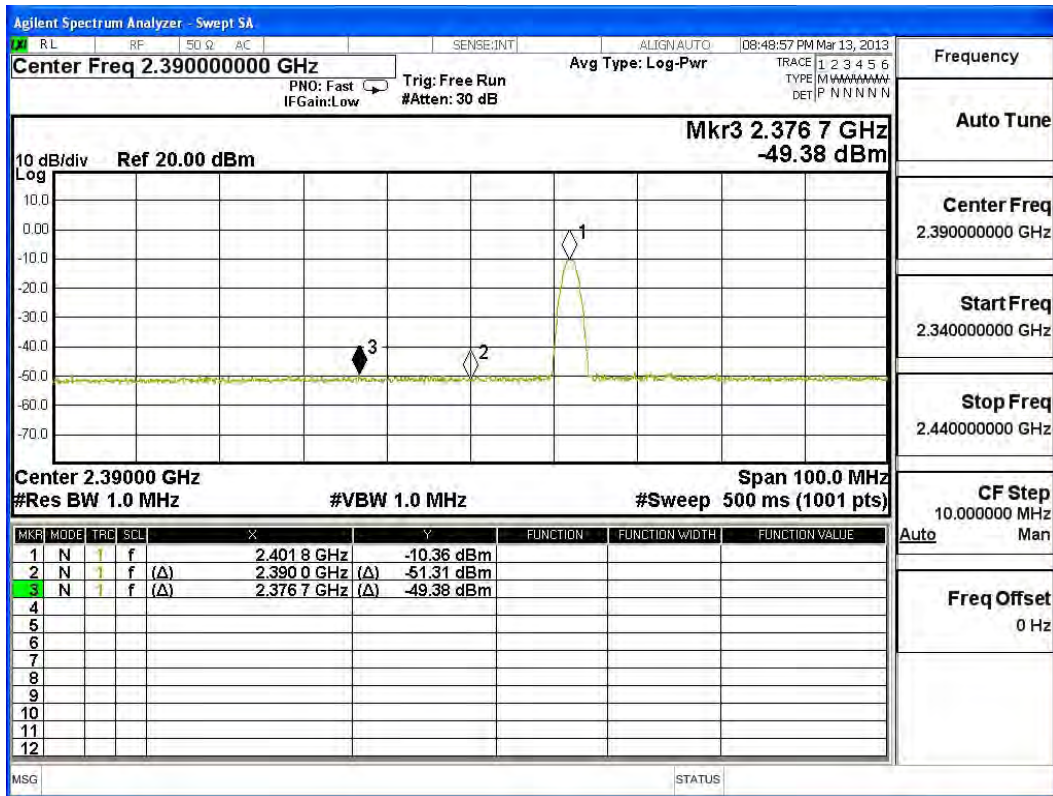
Band Edge field Strength = F -  $\Delta$

F = Fundamental field Strength (Peak or Average)

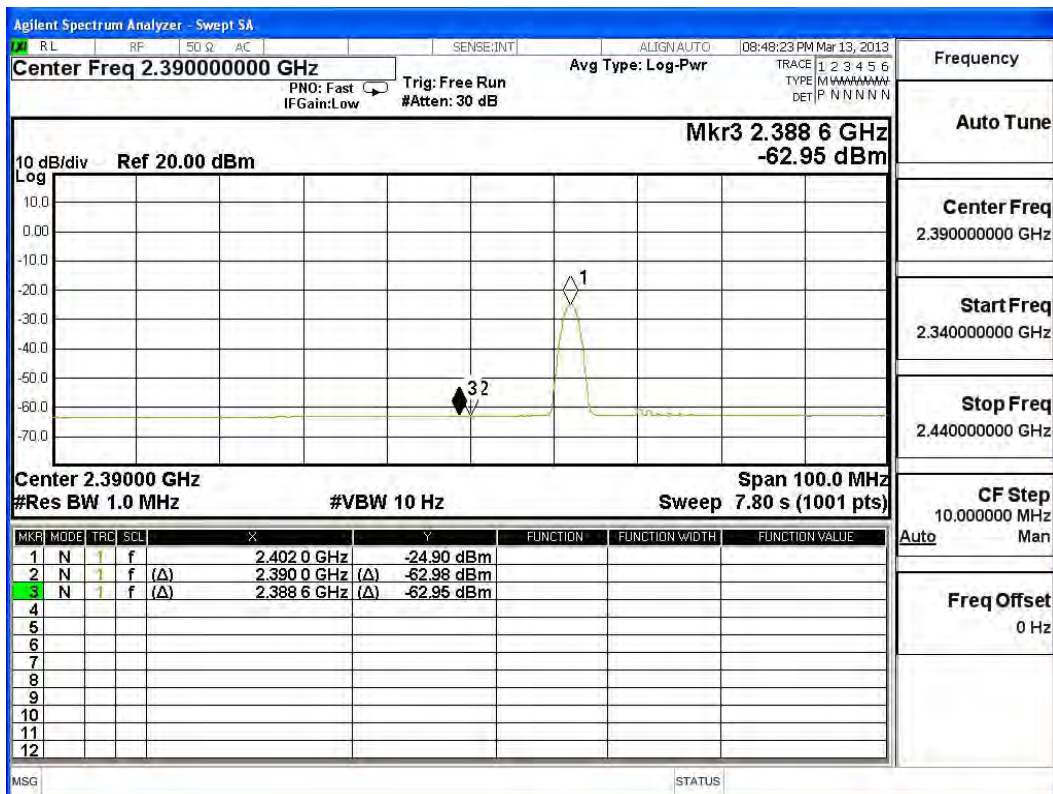
$\Delta$  = Conducted Band Edge Delta (Peak or Average)



### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 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	32.155	51.68	83.836	Peak
Horizontal	2480	32.155	38.42	70.576	Average
Vertical	2480	31.412	46.45	77.862	Peak
Vertical	2480	31.412	34.44	65.852	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)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2489.5	83.836	38.6	45.236	74.000	Peak
Horizontal	2496.8	70.576	37.66	32.916	54.000	Average
Vertical	2489.5	77.862	38.6	39.262	74.000	Peak
Vertical	2496.8	65.852	37.66	28.192	54.000	Average

Note:

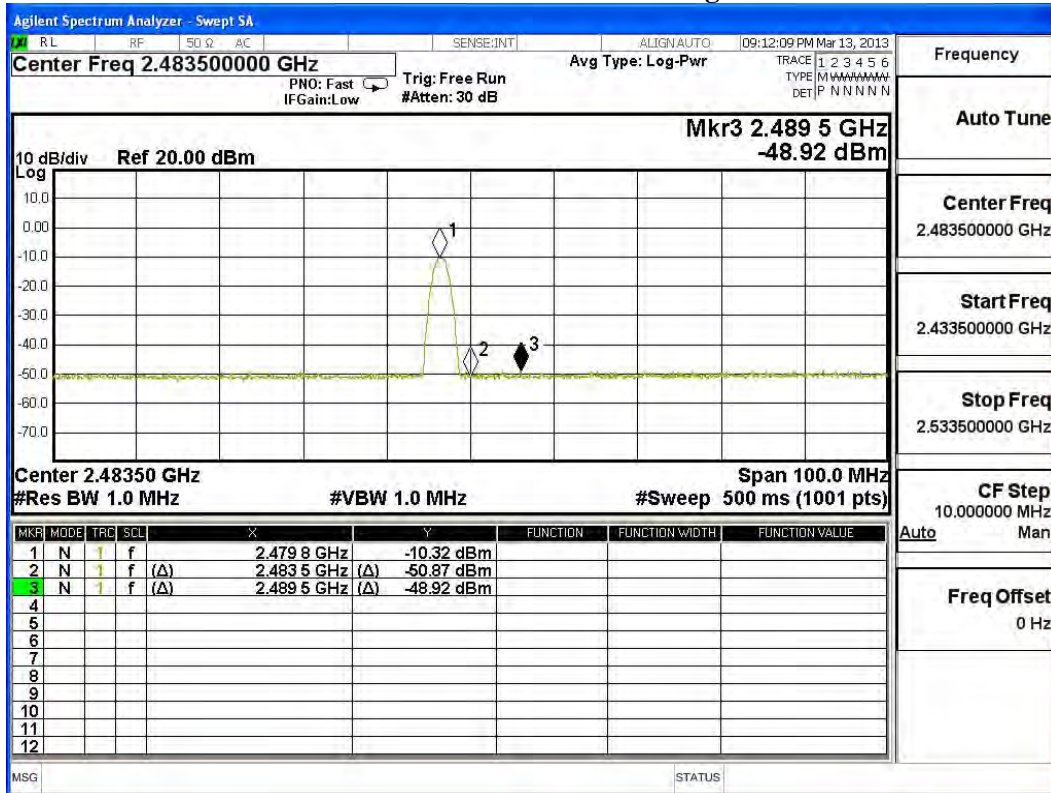
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

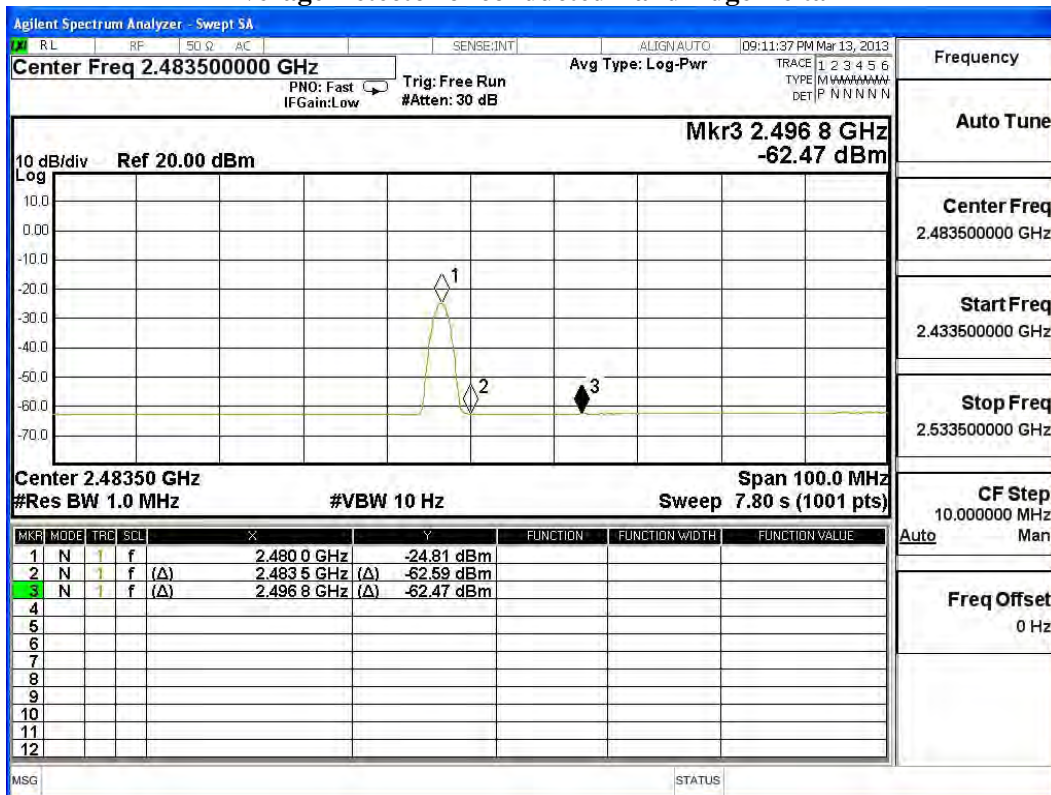
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



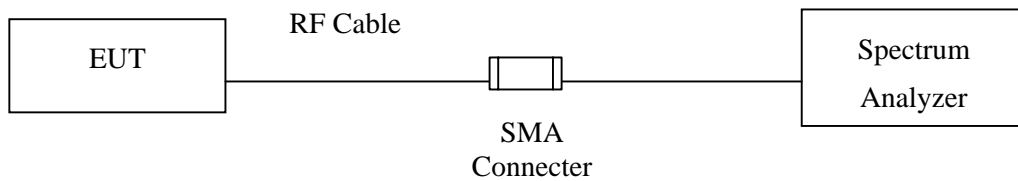
**7. Channel Number**

**7.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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**

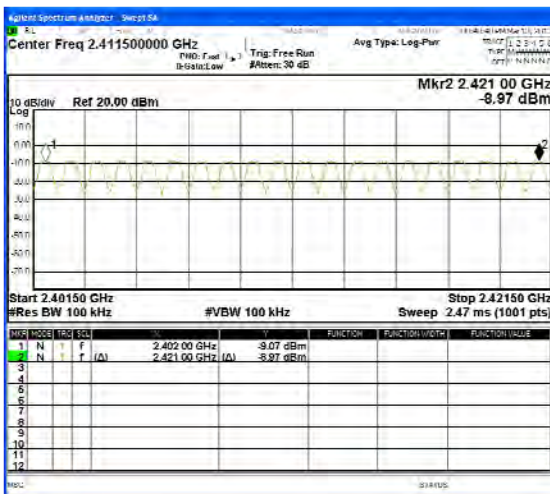
N/A

### 7.6. Test Result of Channel Number

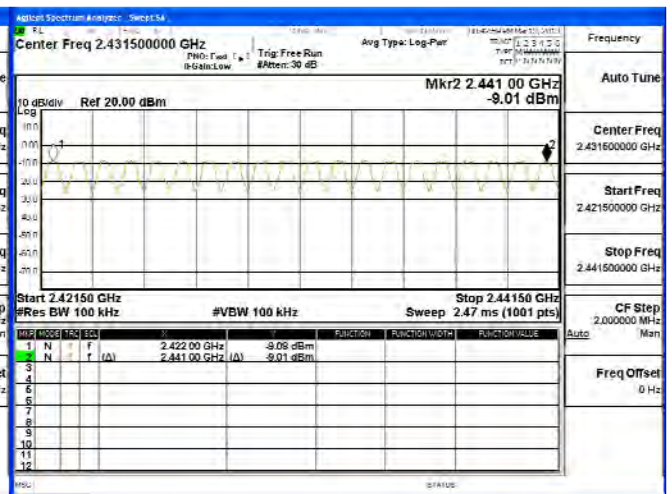
Product : Infotainment System with Headunit (with BT, WLAN, Kler technology)  
 Test Item : Channel Number  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

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

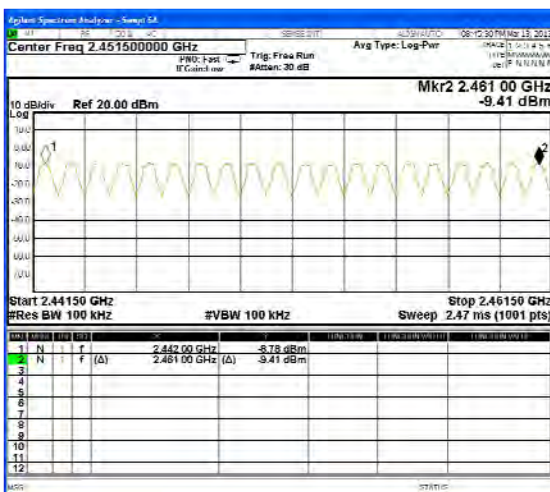
2402-2421MHz



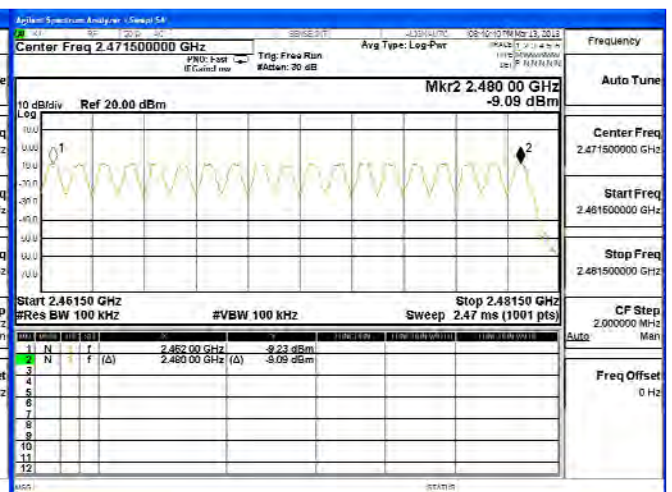
2422-2441MHz



2442-2461MHz



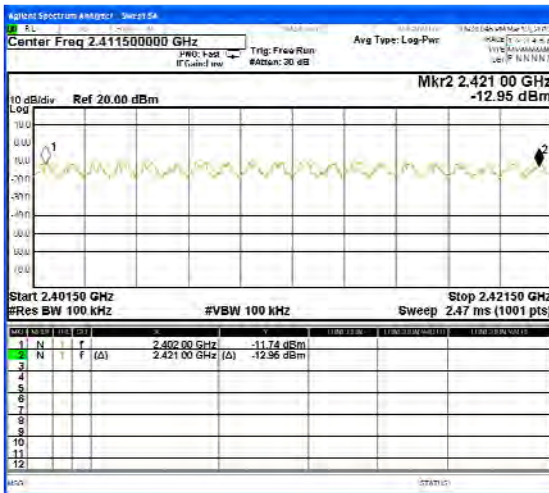
2462-2480MHz



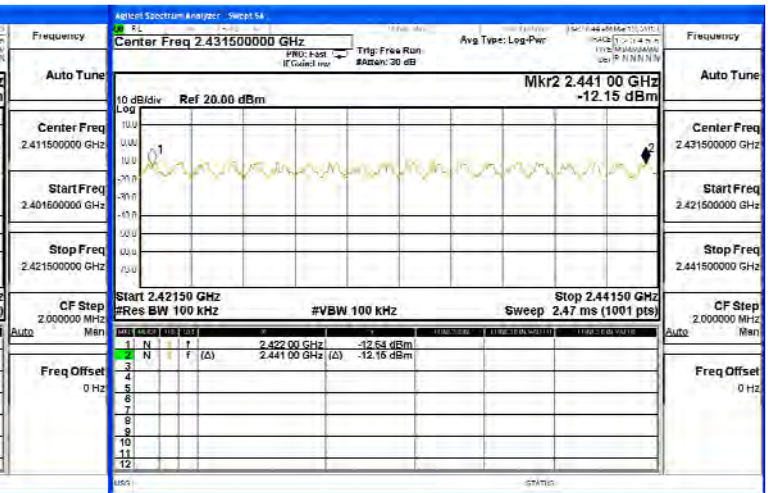
Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Channel Number  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

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

2402-2421MHz



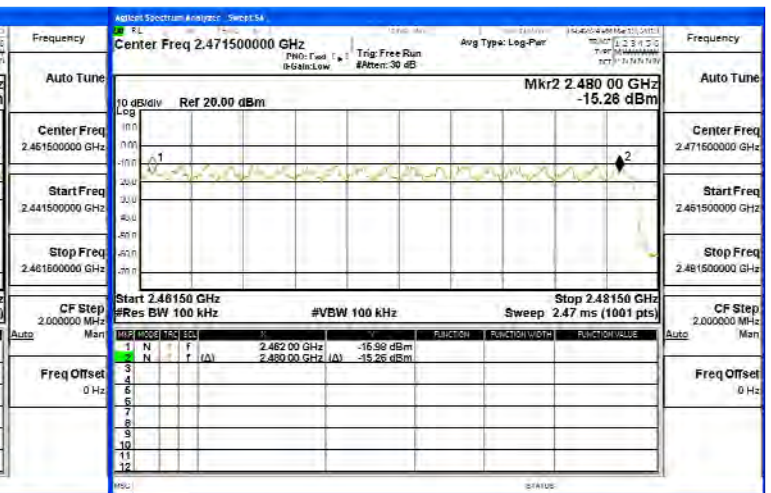
2422-2441MHz



2442-2461MHz



2462-2480MHz



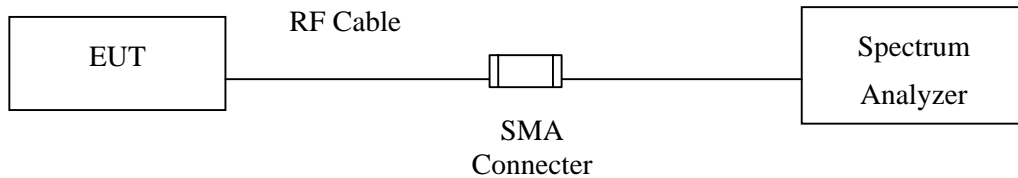
**8. Channel Separation**

**8.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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

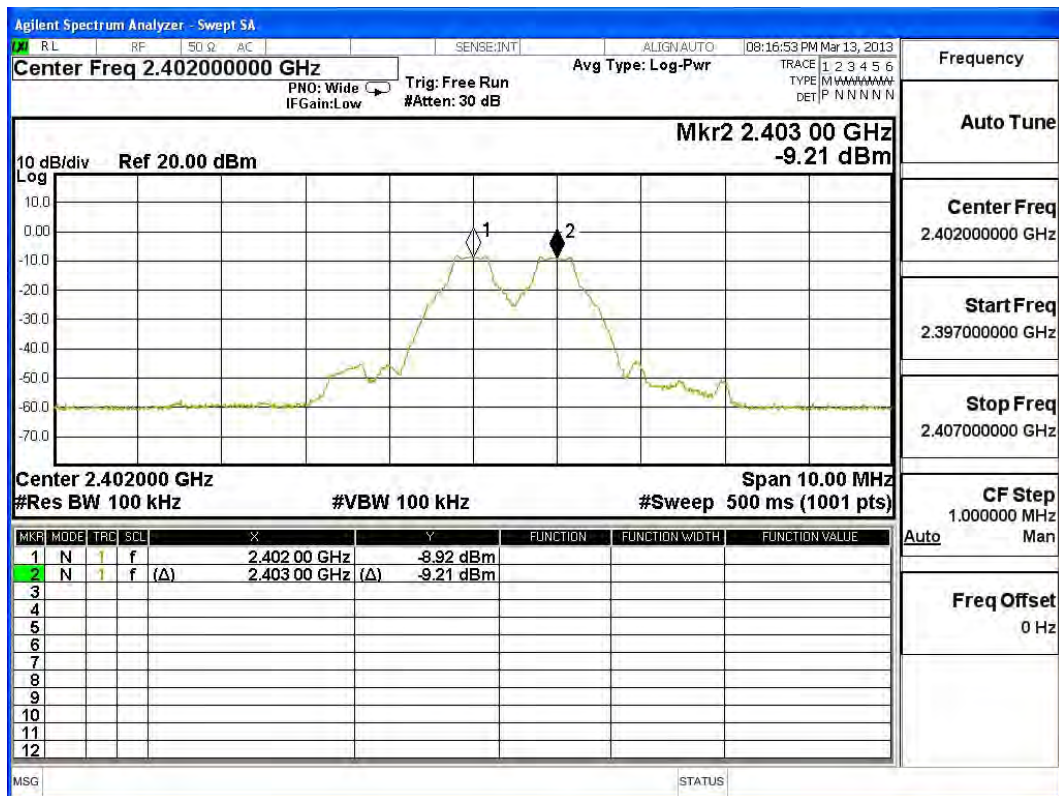
### 8.6. Test Result of Channel Separation

Product : Infotainment System with Headunit (with BT, WLAN, Kler technology)  
 Test Item : Channel Separation  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

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

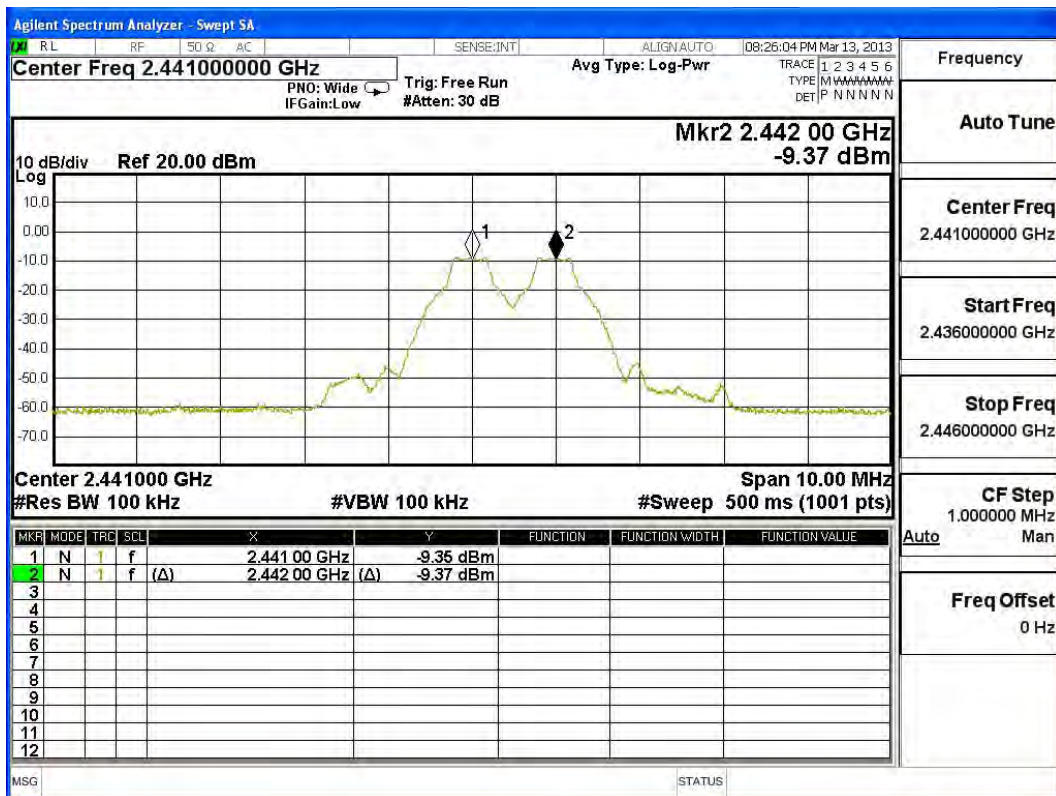
NOTE: The 20dB Bandwidth is refer to section 10.

#### Channel 00 2402MHz

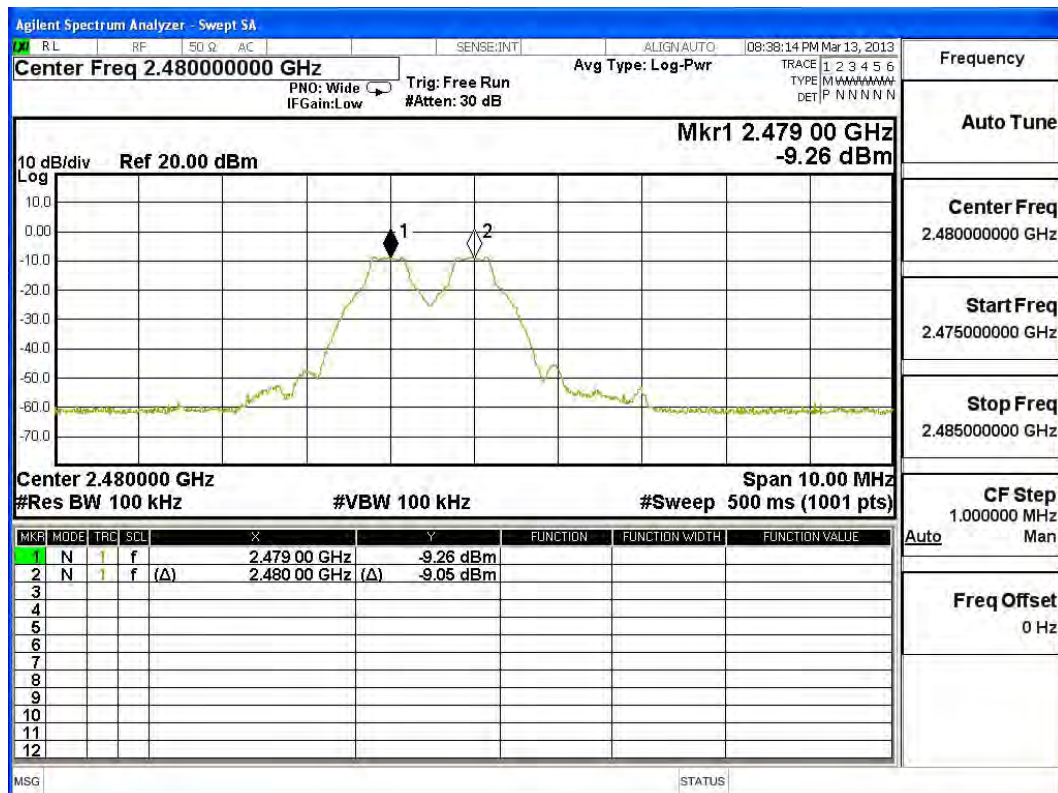




Channel 39 2441MHz



Channel 78 2480 MHz

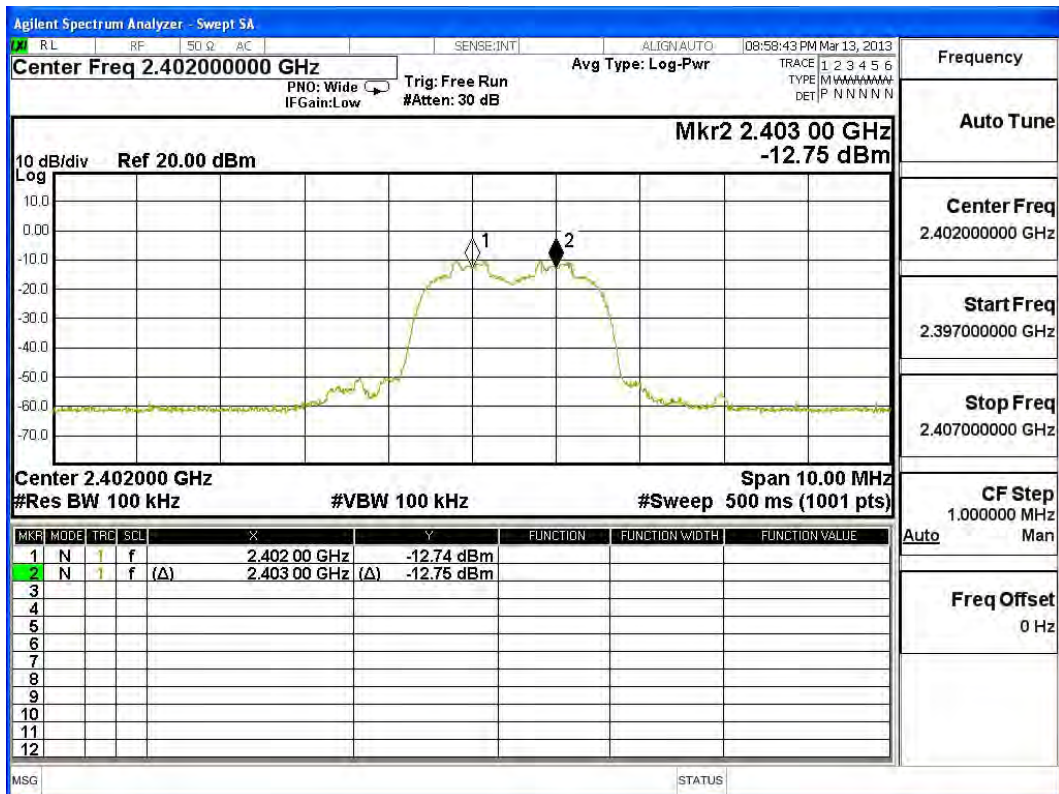


Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Channel Separation  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

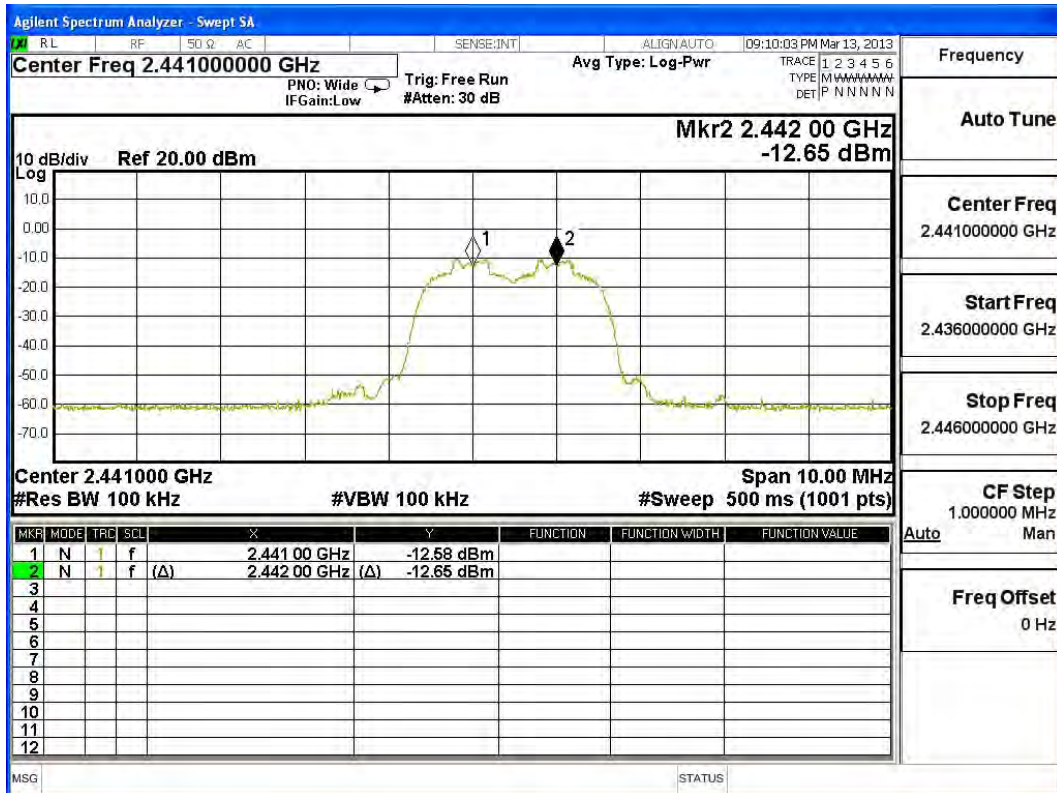
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	906.7	Pass
39	2441	1000	>25 kHz	920.0	Pass
78	2480	1000	>25 kHz	900.0	Pass

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

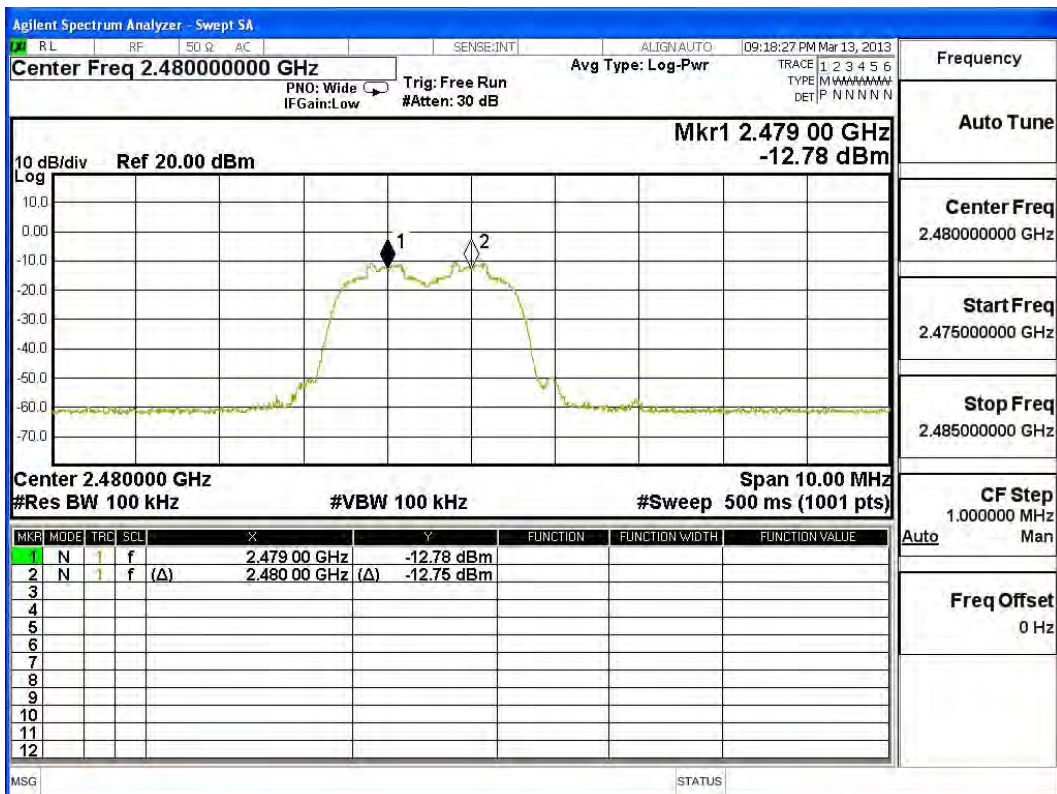
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



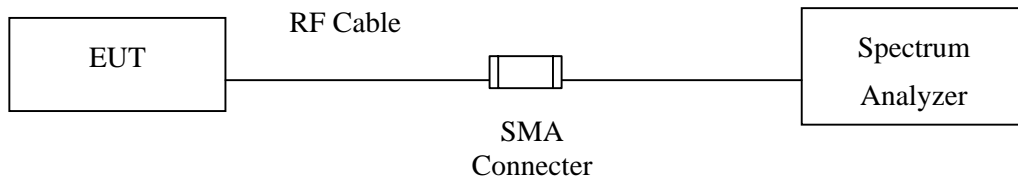
**9. Dwell Time**

**9.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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

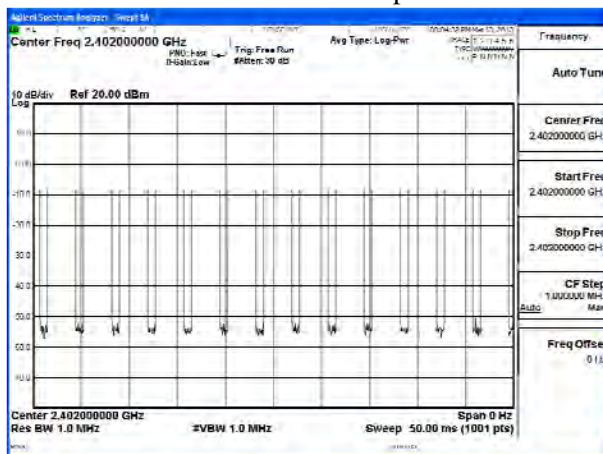
Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Dwell Time  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.880	13	50	0.75	0.300	0.4	Pass
2441	2.870	13	50	0.75	0.298	0.4	Pass
2480	2.880	13	50	0.75	0.300	0.4	Pass

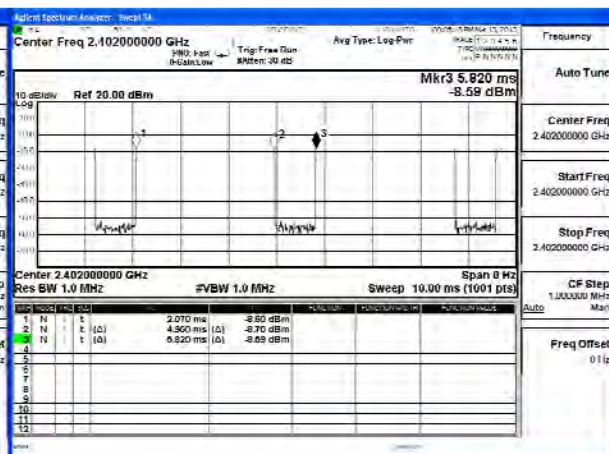
Duty cycle = ((Time slot length(ms)\*Hopping of Number) / Sweep time (ms))

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

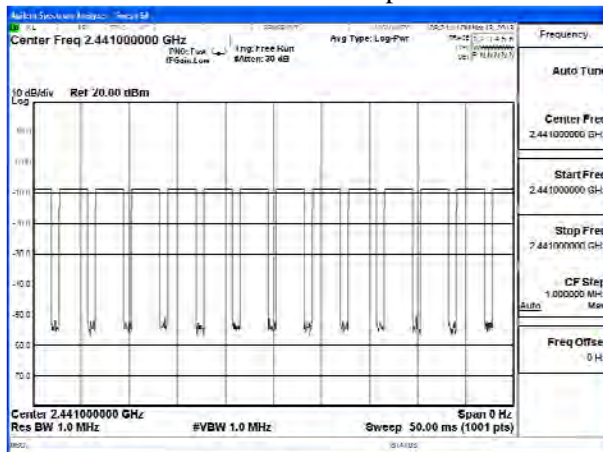
CH 00 Time Interval between hops



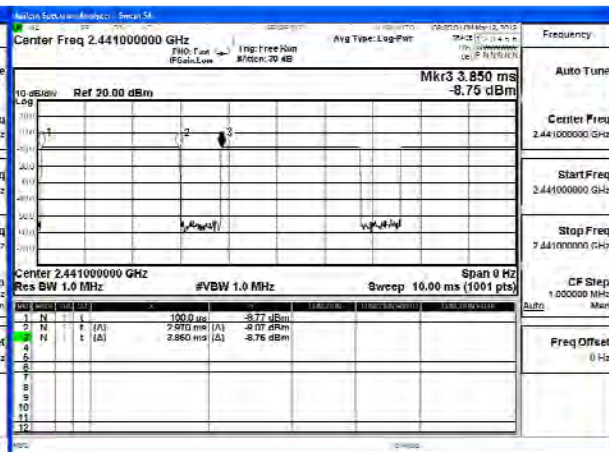
CH 00 Transmission Time



CH39 Time Interval between hops

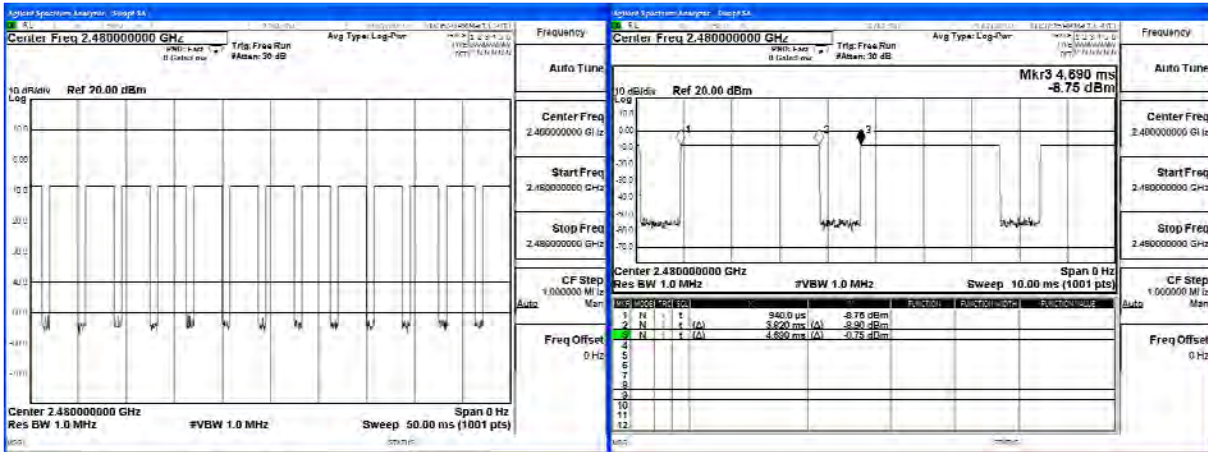


CH 39 Transmission Time



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.

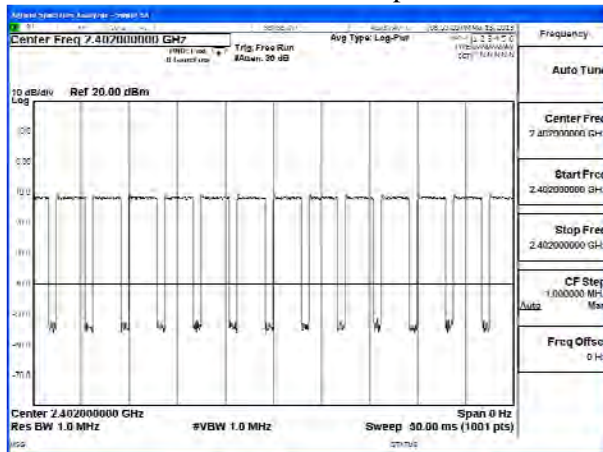
Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Dwell Time  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.880	13	50	0.75	0.300	0.4	Pass
2441	2.880	13	50	0.75	0.300	0.4	Pass
2480	2.870	13	50	0.75	0.298	0.4	Pass

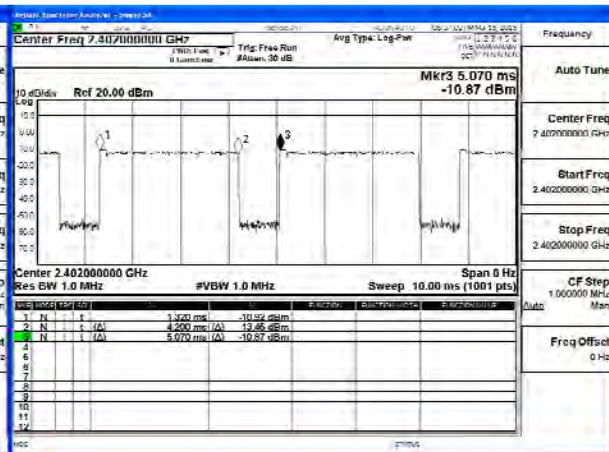
Duty cycle = ((Time slot length(ms)\*Hopping of Number) / Sweep time (ms))

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

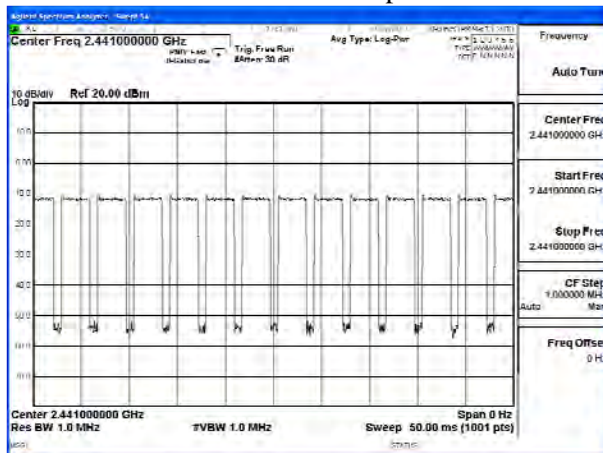
CH 00 Time Interval between hops



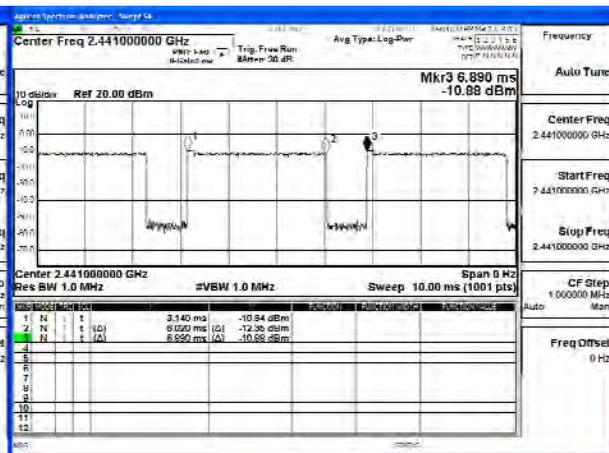
CH 00 Transmission Time



CH39 Time Interval between hops

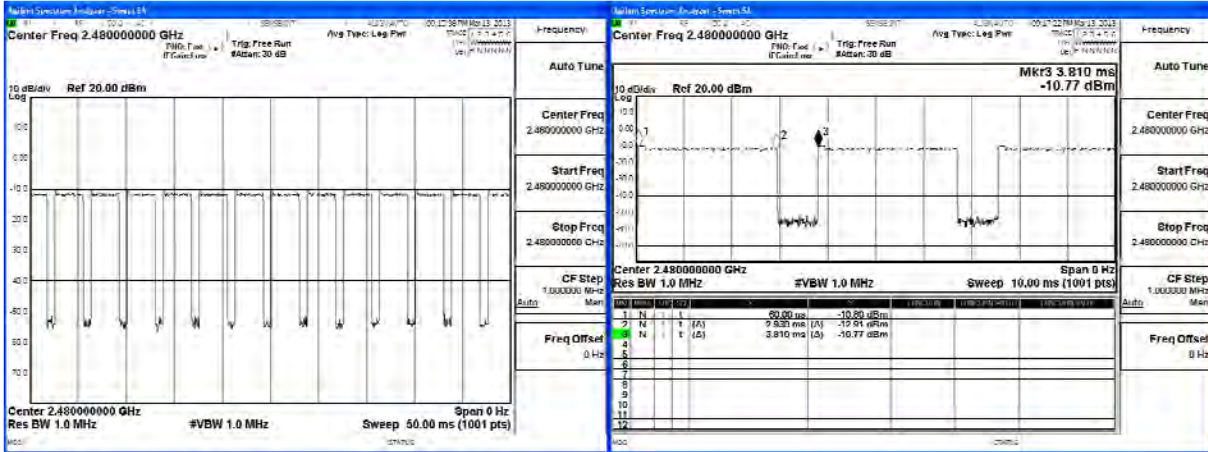


CH 39 Transmission Time



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.



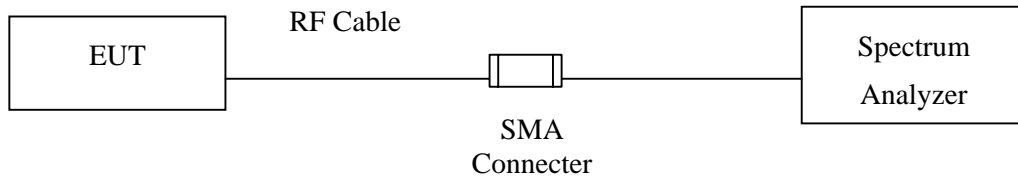
**10. Occupied Bandwidth**

**10.1. Test Equipment**

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

- 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**

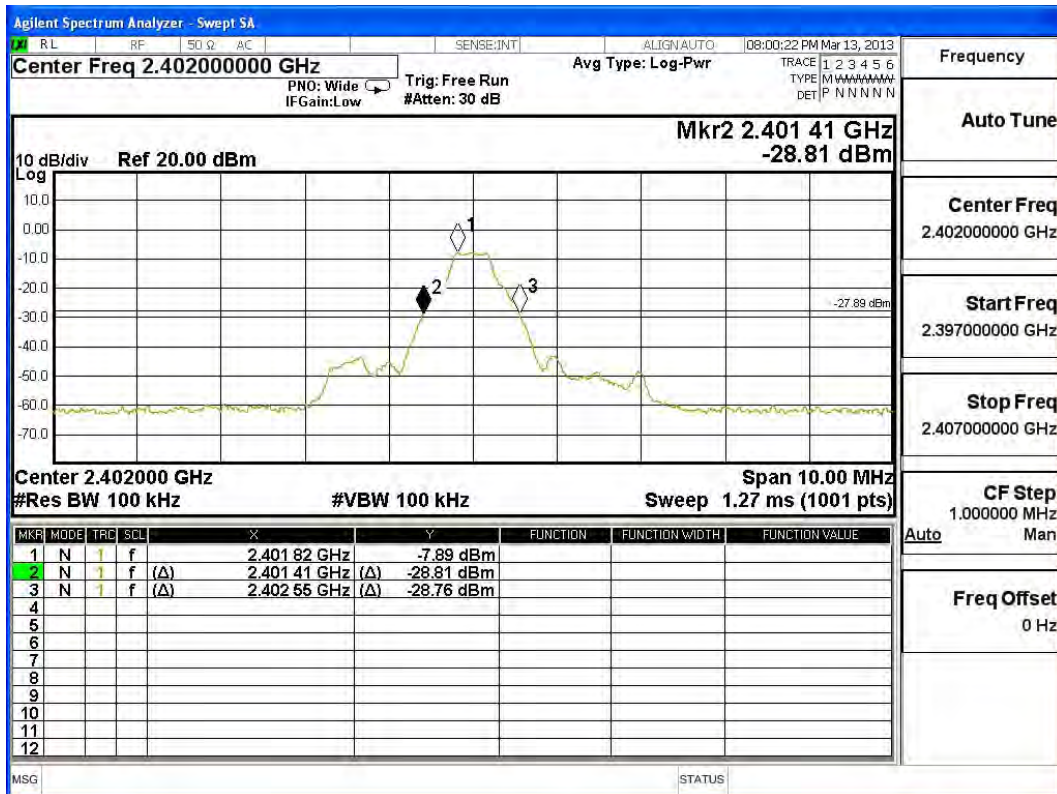
± 150Hz

### 10.6. Test Result of Occupied Bandwidth

Product : Infotainment System with Headunit (with BT, WLAN, Kler technology)  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1140	--	NA

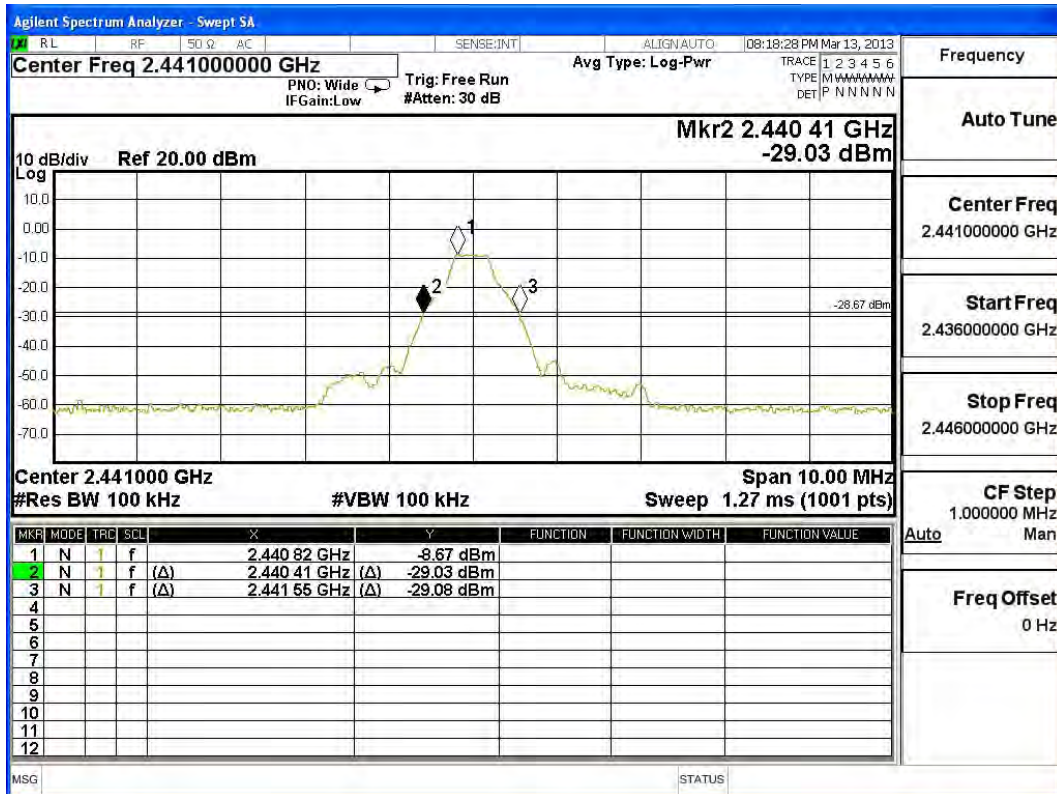
Figure Channel 00:



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1140	--	NA

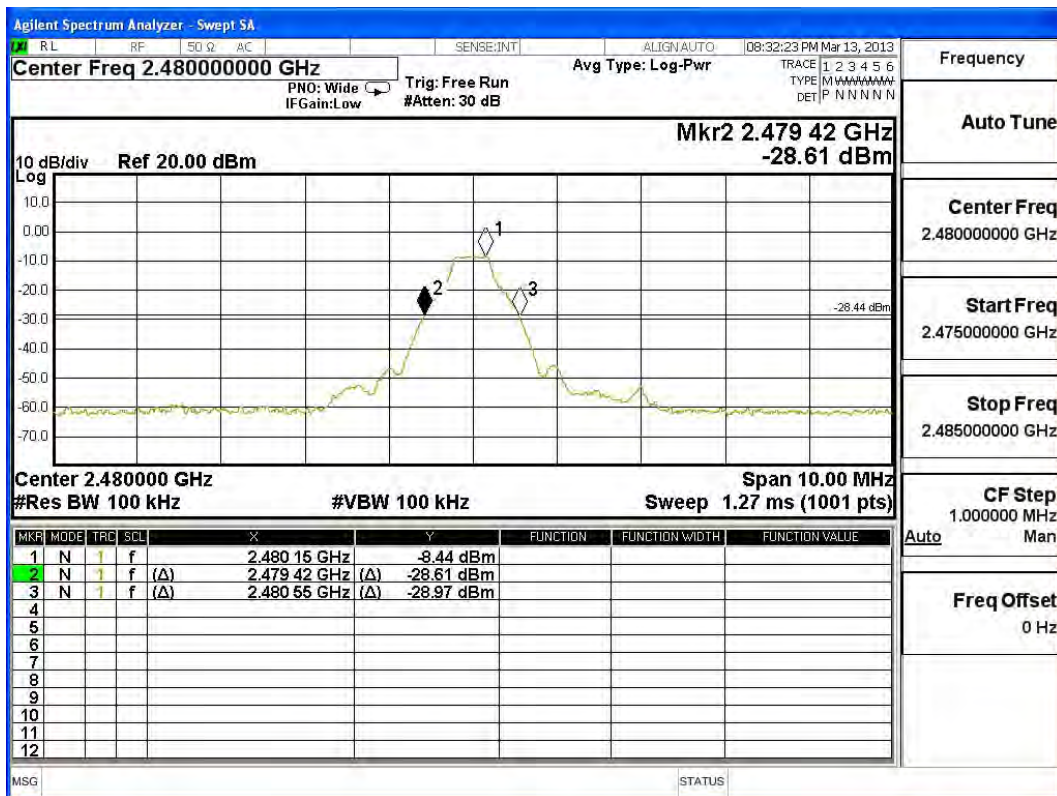
Figure Channel 39:



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	1130	--	NA

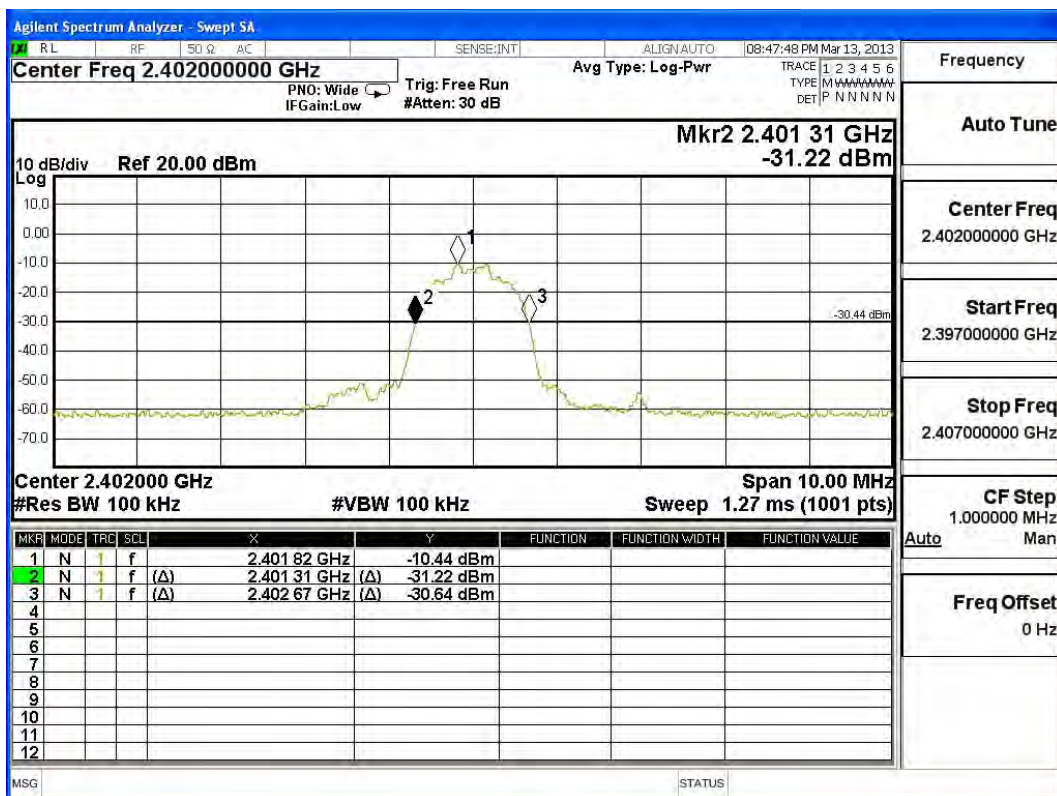
Figure Channel 78:



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1360	--	NA

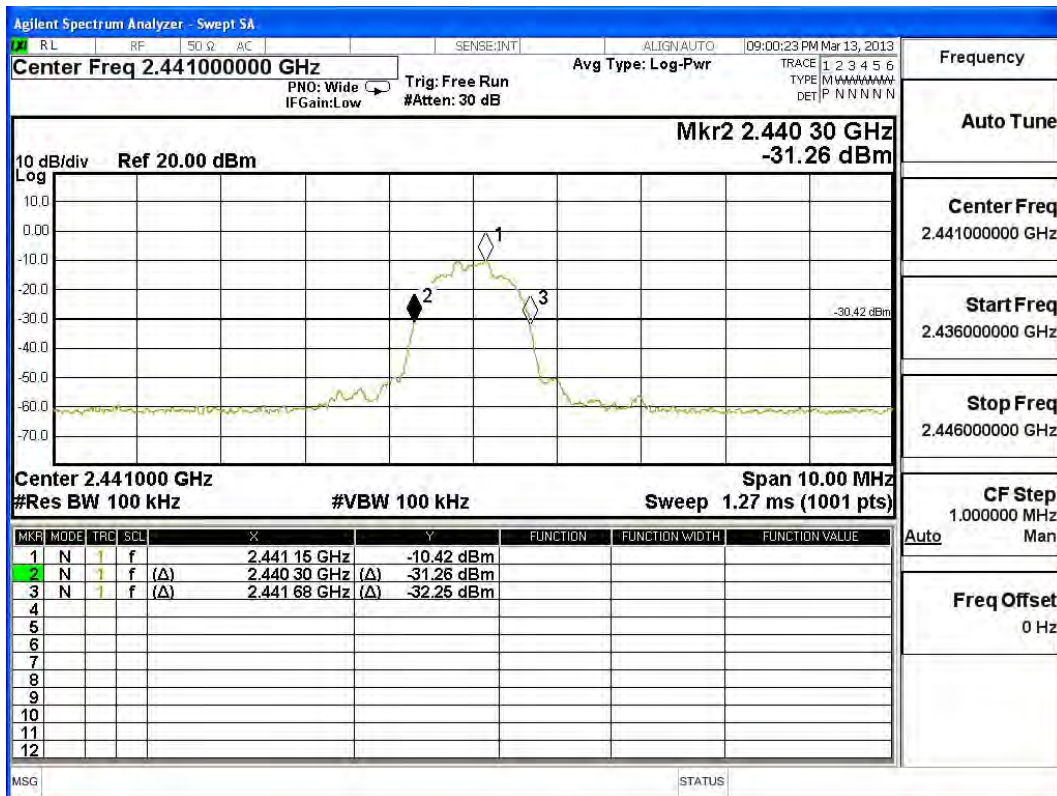
Figure Channel 00:



Product : Infotainment System with Headunit (with BT, WLAN, Kler technology)  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1380	--	NA

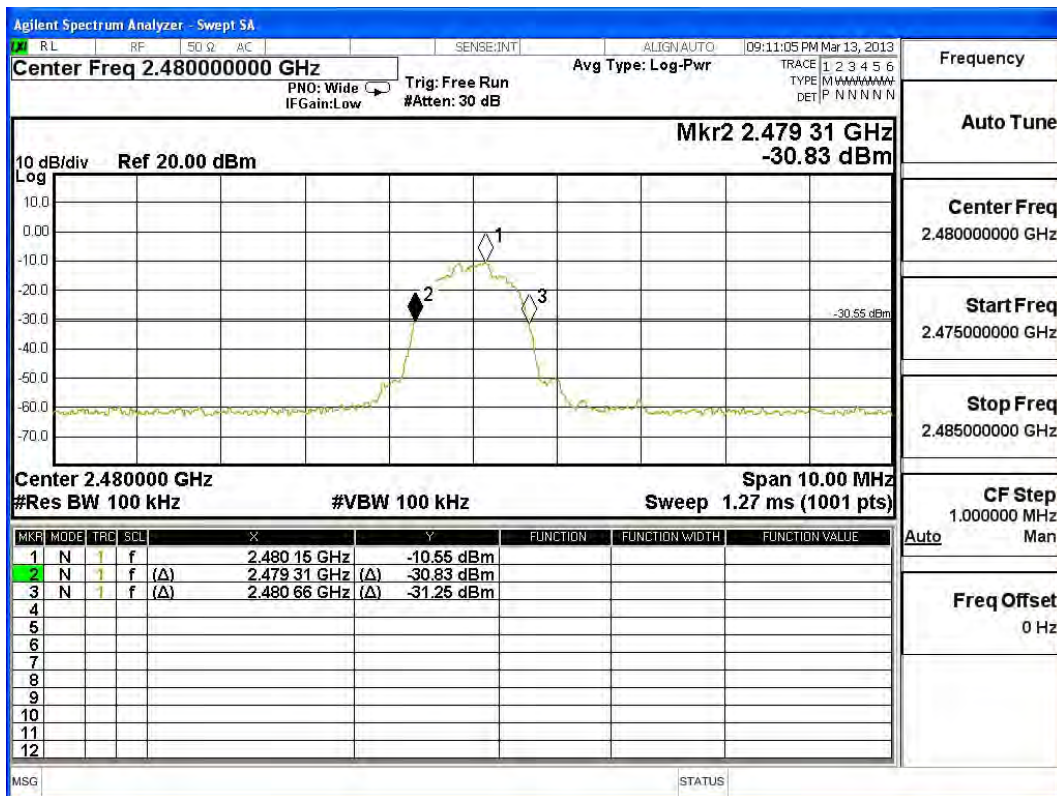
Figure Channel 39:



Product : Infotainment System with Headunit (with BT, WLAN, Klear technology)  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)(2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	1350	--	NA

Figure Channel 78:



## 11. EMI Reduction Method During Compliance Testing

No modification was made during testing.



## Attachment 1: EUT Test Photographs

## Attachment 2: EUT Detailed Photographs