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Testing of

Electromagnetic Emissions

per

USA: CFR Title 47, Part 15.247 (FHSS)

are herein reported for

Clarion Corporation Of America
A8DGEN3-1D

Test Report No.: 20141211-01r2

Applicant/Provider:
Clarion Corporation Of America
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Measured by:	Dr. Joseph Brunett, EMC-002790-NE	Report Approved by:	Dr. Joseph Brunett, EMC-002790-NE
Report by:	Dr. Joseph Brunett, EMC-002790-NE	Report Date of Issue:	December 11, 2014

Results of testing completed on (or before) November 15, 2014 are as follows.

Emissions: The transmitter intentional emissions **COMPLY** with the regulatory limit(s) by no less than 39.7 dB. Transmit chain spurious harmonic emissions **COMPLY** by no less than 6.9 dB. Radiated spurious emissions associated with the receive chain of this device **COMPLY** the regulatory limit(s) by no less than 7.7 dB.

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1 Test Specifications, General Procedures, and Location

1.1 Test Specification and General Procedures

The ultimate goal of Clarion Corporation Of America is to demonstrate that the Equipment Under Test (EUT) complies with the Rules and/or Directives below. Detailed in this report are the results of testing the Clarion Corporation Of America A8DGEN3-1D for compliance to:

Country/Region	Rules or Directive	Referenced Section(s)
United States	Code of Federal Regulations	CFR Title 47, Part 15.247 (FHSS)

Clarion Corporation Of America has determined that the equipment under test is subject to the rules and directives above at the date of this testing. In conjunction with these rules and directives, the following specifications and procedures are followed herein to demonstrate compliance (in whole or in part) with these regulations.

ANSI C63.4-2009	"Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
FCC DA 00-705	"Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems"

1.2 Test Location and Equipment Used

Test Location The EUT was fully tested by **Willow Run Test Labs, LLC**, 8501 Beck Road, Building 2227, Belleville, Michigan 48111 USA. The Test Facility description and attenuation characteristics are on file with the FCC Laboratory, Columbia, Maryland (FCC Reg. No: 688478) and with Industry Canada, Ottawa, ON (File Ref. No: IC 8719A-1).

Test Equipment Pertinent test equipment used for measurements at this facility is listed in Table 1. The quality system employed at Willow Run Test Labs, LLC has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to the SI through NIST, other recognized national laboratories, accepted fundamental or natural physical constants, ratio type of calibration, or by comparison to consensus standards.

Table 1: Willow Run Test Labs, LLC Equipment List.

Description	Manufacturer/Model	SN	Quality Number	Last Cal By / Date Due
Antennas				
Shielded Loop (9 kHz - 50 MHz)	EMCO/6502	2855	UMLOOP1	UMRL / July-2015
Dipole Set (20 MHz - 1000 MHz)	EMCO/3121C	9504-1121	DIPEMC001	Liberty Labs / Sept-2016
Bicone (20 MHz - 250 MHz)	JEF	1	BICJEF001	UMRL / July-2015
Bicone (200 MHz - 1000 MHz)	JEF	1	SBICJEF001	UMRL / July-2015
Log-Periodic Array (0.2 – 1 GHz)	JEF/Isbell	1	LOGJEF001	UMRL / July-2015
Ridge-Horn Antenna	Univ. of Michigan	5	UMHORN005	UMRL / July-2015
L-Band	JEF		HRNL001	WRTL / July-2015*
LS-Band Horns	JEF/NRL	001, 002	HRN15001, HRN15002	WRTL / July-2015*
S-Band Horns	Scientific-Atlanta	1854	HRNSB001	WRTL / July-2015*
C-Band	JEF/NRL	1	HRNC001	WRTL / July-2015*
XN-Band Horns	JEF/NRL	001, 002	HRNXN001, HRNXN002	WRTL / July-2015*
X-Band Horns	JEF/NRL	001, 002	HRNXB001, HRNXB002	WRTL / July-2015*
Ku-Band Horns	JEF/NRL	001, 002	HRNKU001, HRNKU002	WRTL / July-2015*
K-Band Horns	JEF/NRL	001, 002	HRNK001, HRNK002	WRTL / July-2015*
Ka-Band Horns	JEF/NRL	001, 002	HRNKA001, HRNKA002	WRTL / July-2015*
U-Band Horns	Microwave Associates	-	HRNU001	WRTL / July-2015*
V-Band Horns	Microwave Associates	-	HRNV001	WRTL / July-2015*
W-Band Horns	Microwave Associates	-	HRNW001	WRTL / July-2015*
Quad-Ridge Horns	Condor AS-48461	C35200	QRH218001	WRTL / July-2015
Analyzers & Generators				
Spectrum Analyzer	R&S/FSV30	101660	RSFSV30001	R&S / Mar-2015
Power Meter (Thermistor)	HP/432B	-	HP432B001	WRTL / as used
Signal Generator	R&S/SMATE200A	-	RSSMATE001	WRTL / as used
Radio Test Set	R&S/CMU200	100104	RSCMU20001	Not Necessary
Bluetooth Test Set (2.0 + EDR)	Agilent/N4010A	GB45500231	HPN4010A01	Not Necessary
Additional Equipment				
Ka-Band Harmonic Mixer	HP/11970A	-	MIXA001, MIXA002	WRTL / July-2015
U-Band Harmonic Mixer	HP/11970U	-	MIXU001, MIXU002	WRTL / July-2015
V-Band Harmonic Mixer	Hughes/47434H-1003	-	MIXV001	WRTL / July-2015
W-Band Harmonic Mixer	Hughes/47436H-1003	-	MIXW001	WRTL / July-2015
Thermal Chamber	Thermotron / S1.2	18706	TC001	as used
Shaker Table	APS Dynamics / APS-300	-	VIB001	as used
Vibration Meter	Extech / SDL800	-	EXTECH1	Extech / 2015
LISN	EMCO	9304-2081	LISNEM001	WRTL / Jan-2015

* Verification Only - Standard Gain Horn Antennas

2 Configuration and Identification of the Equipment Under Test

2.1 Description and Declarations

The EUT is a vehicular Bluetooth transceiver. The EUT is approximately 18 x 11 x 23 cm (max) in dimension, and is depicted in Figure 1. It is powered by a 13.4 VDC vehicular power system. This product is used in a consumer motor vehicle as a Bluetooth interface. Table 2 outlines provider declared EUT specifications.

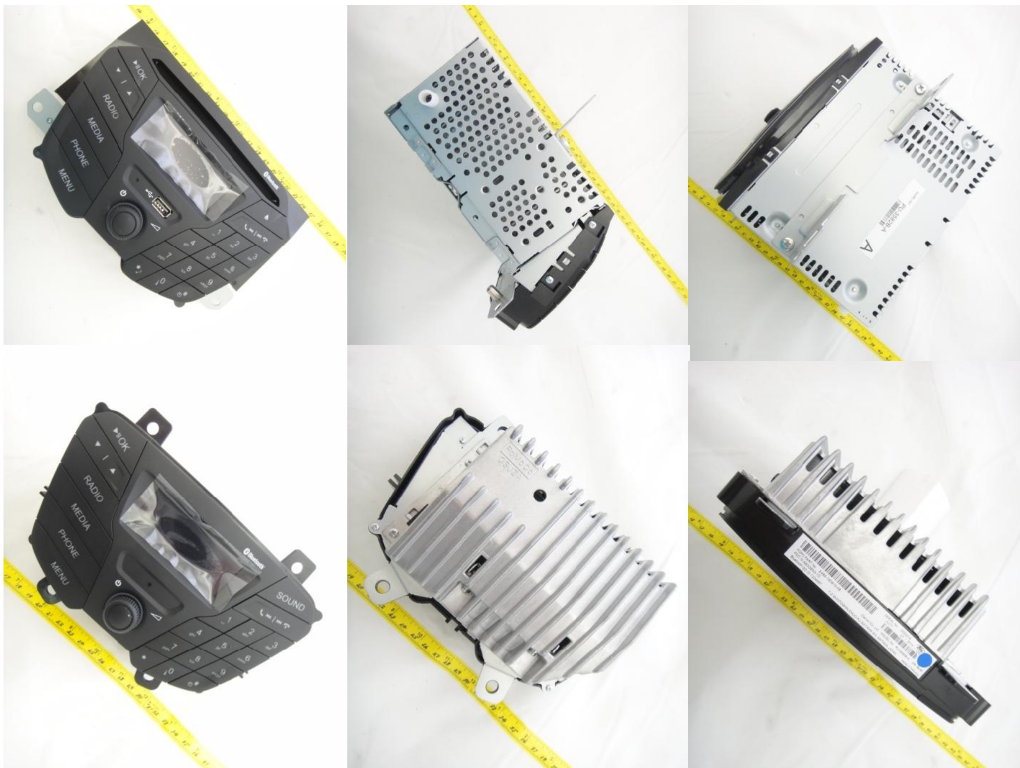

Figure 1: Photos of EUT.

Table 2: EUT Declarations.

General Declarations			
Equipment Type:	Bluetooth Head Unit	**Country of Origin:**	USA
Nominal Supply:	13.4 VDC	**Oper. Temp Range:**	Not Declared
Frequency Range:	2402 – 2480 MHz	**Antenna Dimension:**	Not Declared
Antenna Type:	Integral	**Antenna Gain:**	Not Declared
Number of Channels:	79	**Channel Spacing:**	1 MHz
Alignment Range:	Not Declared	**Type of Modulation:**	GFSK,pi/4-DQPSK,8DPSK
United States			
FCC ID Number:	A8DGEN3-1D	**Classification:**	DSS

2.1.1 EUT Configuration

The EUT is configured for testing as depicted in Figure 2.

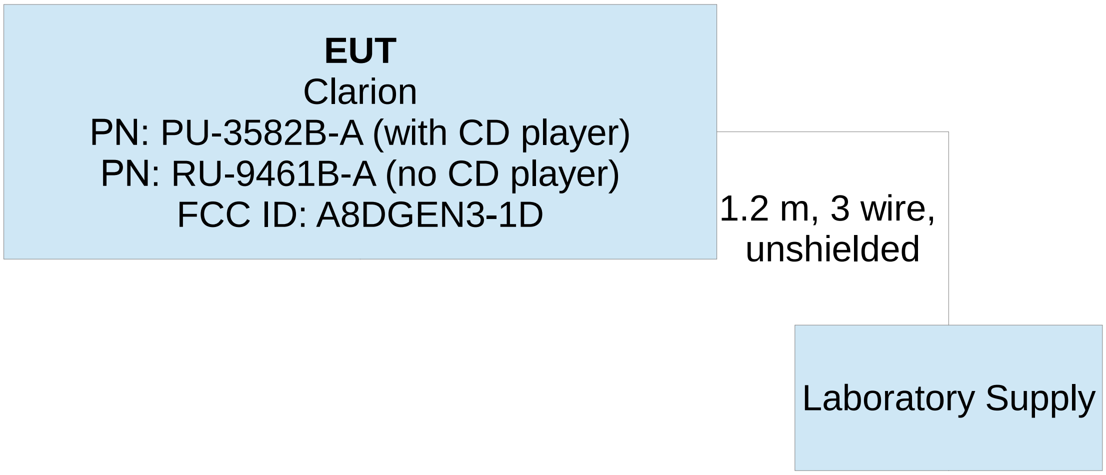

Figure 2: EUT Test Configuration Diagram.

2.1.2 Modes of Operation

The EUT is capable of operating as a Bluetooth transceiver and as a broadcast (AM/FM) receiver. As a Bluetooth 2.0+EDR device, the EUT is capable of operation as a transciever employing GFSK, pi/4-DPSK, and 8DPSK modulations at 1, 2, and 3 Mbps data rates. Test samples were placed into worst-case operating modes using our Agilent N4010A Bluetooth test set. Please note that the different operating modes (data-mode, acquisition-mode) of a Bluetooth device do not influence the channel spacing or peak output power. There is only one transmitter which is driven by identical input parameters concerning these values.

The AM/FM broadcast receiver included in this product is subject only to emissions verification testing. No other transmitters or transceivers are employed within the EUT.

2.1.3 Variants

There are two variants of the EUT, as tested. Both variants contain electrically identical Bluetooth radio modules with built-in antenna, but variant PN: PU-3582B-A employs a CD player as part of its digital components, while variant PN: RU-9461B-A does not employ a CD player.

2.1.4 Test Samples

Four test samples were provided for testing. Two samples (one of each variant) were provided with coaxial cables attached at the antenna port to allow for conducted emissions measurements. The other two test samples provided were normal operating samples with BT DUT mode software enabled.

2.1.5 Functional Exerciser

All EUTs provided were a normal operating samples, active when power was applied. Functionality was confirmed by Bluetooth loopback with our test set.

2.1.6 Modifications Made

There were no modifications made to the EUT by this laboratory.

2.1.7 Production Intent

The EUTs appear to be a production ready samples.

2.1.8 Declared Exemptions and Additional Product Notes

The EUT is permanently installed in a transportation vehicle. As such, digital emissions are exempt from US and Canadian digital emissions regulations (per FCC 15.103(a) and IC correspondence on ICES-003).

3 Emissions

3.1 General Test Procedures

3.1.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are first evaluated in our shielded fully anechoic chamber. Spectrum and modulation characteristics of all emissions are recorded, and emissions above 1 GHz are fully characterized. The anechoic chamber contains a set-up similar to that of our outdoor 3-meter site, with a turntable and antenna mast. Instrumentation, including spectrum analyzers and other test equipment as detailed in Section 1.2 are employed. After indoor pre-scans, emission measurements are made on our outdoor 3-meter Open Area Test Site (OATS). If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.4 / CISPR-22 are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 3. All

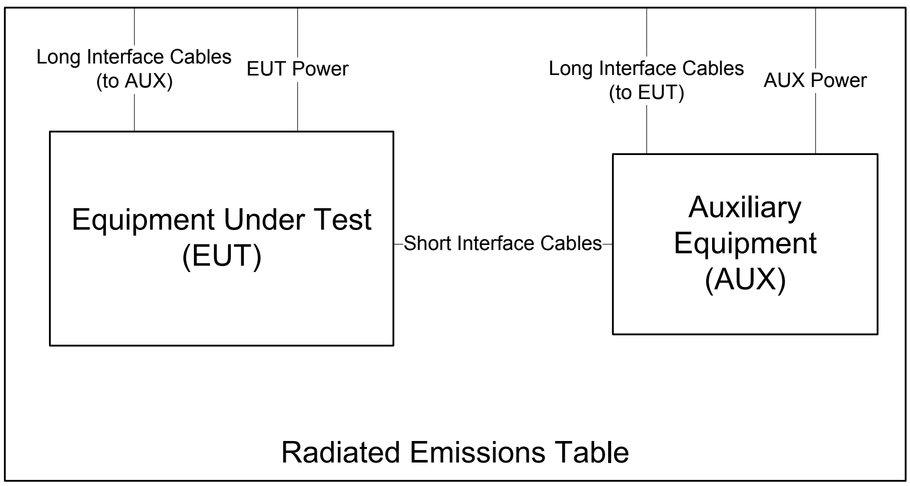

Figure 3: Radiated Emissions Diagram of the EUT.

intentionally radiating elements that are not fixed-mounted in use are placed on the test table lying flat, on their side, and on their end (3-axes) and the resulting worst case emissions are recorded. If the EUT is fixed-mounted in use, measurements are made with the device oriented in the manner consistent with installation and then emissions are recorded.

If the EUT exhibits spurious emissions due to internal receiver circuitry, such emissions are measured with an appropriate carrier signal applied. For devices with intentional emissions below 30 MHz, a shielded loop antenna is used as the test antenna. It is placed at a 1 meter receive height and appropriate low frequency magnetic field extrapolation to the regulatory limit distance is employed. Emissions between 30 MHz and 1 GHz are measured using tuned dipoles and/or calibrated broadband antennas. For both horizontal and vertical polarizations, the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected. The EUT is then rotated through 360^o in azimuth until the highest emission is detected. The test antenna is then raised and lowered one last time from 1 to 4 m and the worst case value is recorded. Emissions above 1 GHz are characterized using standard gain horn antennas or calibrated broadband ridge-horn antennas on our OATS with a 2.4m x 2.4m square of AN-79 absorber placed over the ground screen between the EUT and the test antenna. Care is taken to ensure that test receiver resolution and video bandwidths meet the regulatory requirements, and that the emission bandwidth of the EUT is not reduced. Photographs of the test setup employed are depicted in Figure 4.

Where regulations allow for direct measurement of field strength, power values (dBm) measured on the test receiver / analyzer are converted to dBμV/m at the regulatory distance, using

$$E_{dist} = 107 + P_R + K_A - K_G + K_E - C_F$$

where P_R is the power recorded on spectrum analyzer, in dBm, K_A is the test antenna factor in dB/m, K_G is the combined pre-amplifier gain and cable loss in dB, K_E is duty correction factor (when applicable) in dB, and C_F is a distance conversion (employed only if limits are specified at alternate distance) in dB. This field strength value is then compared with the regulatory limit. If effective isotropic radiated power (EIRP) is compute, it is computed as

$$EIRP(dBm) = E_{3m}(dB\mu V/m) - 95.2.$$

When presenting data at each frequency, the highest measured emission under all possible EUT orientations (3-axes) is reported.

Figure 4: Radiated Emissions Test Setup Photograph(s).

3.1.2 Conducted Emissions Test Setup and Procedures

Transmit Antenna Port Conducted Emissions At least one sample EUT supplied for testing was provided with a 50Ω antenna port. Conducted transmit chain emissions measurements (where applicable) are made by connecting the EUT antenna port directly to the test receiver port. Photographs of the test setup employed are depicted in Figure 5.

Figure 5: Conducted RF Test Setup Photograph(s).

Vehicle Power Conducted Spurious The EUT is not subject to power line conducted emissions regulations as it is powered solely by the vehicle power system for use in said motor vehicle.

3.1.3 Power Supply Variation

Tests at extreme supply voltages are made if required by the the procedures specified in the test standard, and results of this testing are detailed in this report.

3.1.4 Thermal Variation

Tests at extreme temperatures are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report. The provider has declared that the EUT is designed for operation over the temperature range Not Declared. Before any temperature measurements are made, the equipment is allowed to reach a thermal balance in the test chamber, temperature and humidity are recorded, and thermal balance is verified via a thermocouple based probe.

3.2 Intentional Emissions

3.2.1 Duty and Transmission Cycle, Pulsed Operation

The details and results of testing the EUT for pulsed operation are summarized in Table 3.

Table 3: Pulsed Emission Characteristics (Duty Cycle).

Frequency Range	Det	IFBW	VBW		
f > 1 000 MHz	Pk	3 MHz	5 MHz	**Test Date:**	12-Nov-14
				Test Engineer:	Joseph Brunett
				EUT	Clarion Head Unit
				Meas. Distance:	Conducted

Pulsed Operation / Duty Cycle								
Transmit Mode	Symbol Rate (Msym/s)	Data Rate (Mbps)	Voltage (V)	Oper. Freq (MHz)	Tx Cycle Time* (ms)	On-Time* (ms)	Duty Cycle (%)	Power Duty Correction (dB)
Hopping	1.000	GFSK (1 Mbps)	13.4	2441.0	-	-	-	20.0
	1.000	Pi/4 DPSK (2 Mbps)	13.4	2441.0	-	-	-	20.0
	1.000	8DPSK (3 Mbps)	13.4	2441.0	-	-	-	20.0

*NOTE: For a FHSS Bluetooth transmitter the peak to average ratio in any given 100 ms window is always less than 10%. Thus, maximum permitted 15.35 duty of 20 dB is applied to peak measurements for demonstrating average field strength compliance, were applicable.

Equipment Used: RSFSV30001

3.2.2 Hopping Channel Dwell Time

The average time of occupancy on any hopping channel must not be greater than 0.4 seconds within a 32 second period for FHSS device with 79 operating channels. For this test, the EUT was set for data transmission with hopping enabled. Results of this testing are depicted in Table 4. Plots showing example measurements made to obtain these values are provided in Figure 6.

Table 4: Hopping Channel Dwell Time.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	100/120 kHz	300 kHz	**Test Date:**	12-Nov-14
f > 1 000 MHz	Pk	3 MHz	3 MHz	**Test Engineer:**	Joseph Brunett
				EUT:	Clarion Head Unit
				Meas. Distance:	Conducted

Dwell Time							
Packet Type	Frequency (MHz)	# Bursts #	Observation Time (sec)	Active Time (sec)	Total On Time** (s)	Limit (s)	Pass/Fail
DH5 (max)	2441.0	60	32.0	0.00294	0.1764	<0.4	Pass
DH1 (min)	2441.0	32	10.0	0.00042	0.0430	<0.4	Pass

* Dwell Time Observed during loopback test with N4010A test set.

**The measured dwell time may not indicate the actual single channel dwell time of the DUT. A dwell time of 0.3797 seconds within a 32 second period in data mode is independent from the packet type (packet length) for all Bluetooth devices. Therefore, Bluetooth devices comply with the dwell time requirement.

Equipment Used: RSFSV30001

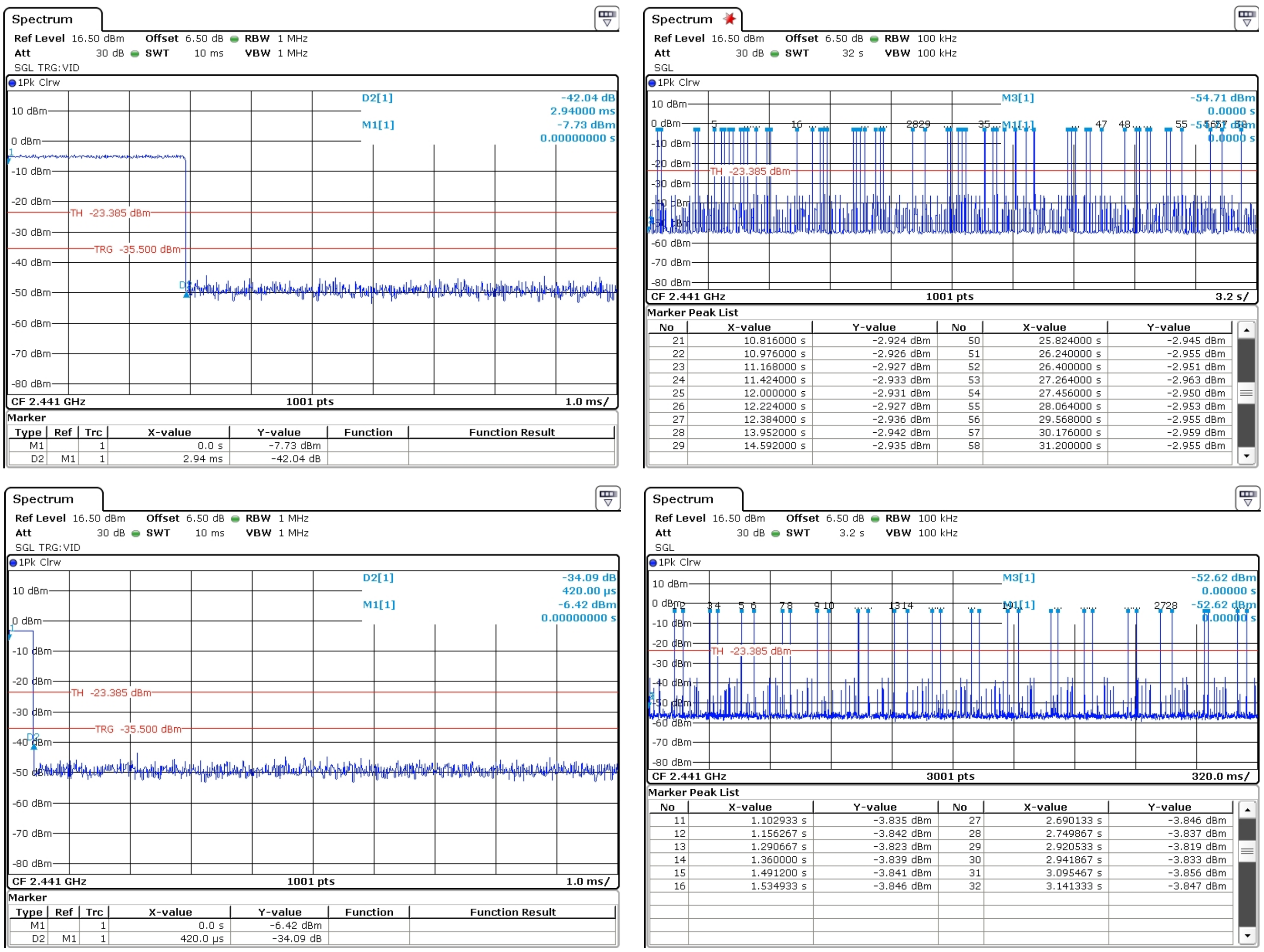

Figure 6: Example Plots of Hopping Channel Dwell Time.

3.2.3 Channel Bandwidth

For this test, the EUT was set continuous data transmission (hopping disabled) in each modulation. The 20-dB bandwidth as well as 99% emission bandwidth were measured for the low, middle, and high channels. Results of these measurements are shown in Table 5. Plots showing example measurements employed to obtain this data are provided in Figure 8.

Table 5: Intentional Emission Bandwidth.

Frequency Range	Det	IFBW	VBW
f > 1 000 MHz	Pk	30 kHz	100 kHz
f > 1 000 MHz	Pk	30 kHz	100 kHz

Test Date:	11/12/14
Test Engineer:	Joseph Brunett
EUT	Clarion Head Unit
Meas. Distance:	Conducted

Occupied Bandwidth

Transmit Mode	Symbol Rate (Msym/s)	Data Rate* (Mbps)	Voltage (V)	Oper. Freq (MHz)	99% OBW (MHz)	OBW Limit (MHz)	20 dB BW (MHz)	20dB BW Limit (MHz)	Pass/Fail
GFSK	1	1.0	13.4	2402.0	0.867	-	0.939	-	Pass
				2441.0	0.865	-	0.933	-	Pass
				2480.0	0.859	-	0.945	-	Pass
PI/4 DQPSK	1	2.0	13.4	2402.0	1.162	-	1.235	-	Pass
				2441.0	1.162	-	1.240	-	Pass
				2480.0	1.162	-	1.240	-	Pass
8QPSK	1	3.0	13.4	2402.0	1.166	-	1.258	-	Pass
				2441.0	1.168	-	1.252	-	Pass
				2480.0	1.165	-	1.255	-	Pass

* Over all modes of operation, the worst case (highest data rate) in each form of modulation was tested to demonstrate compliance.

Equipment Used: RSFSV30001

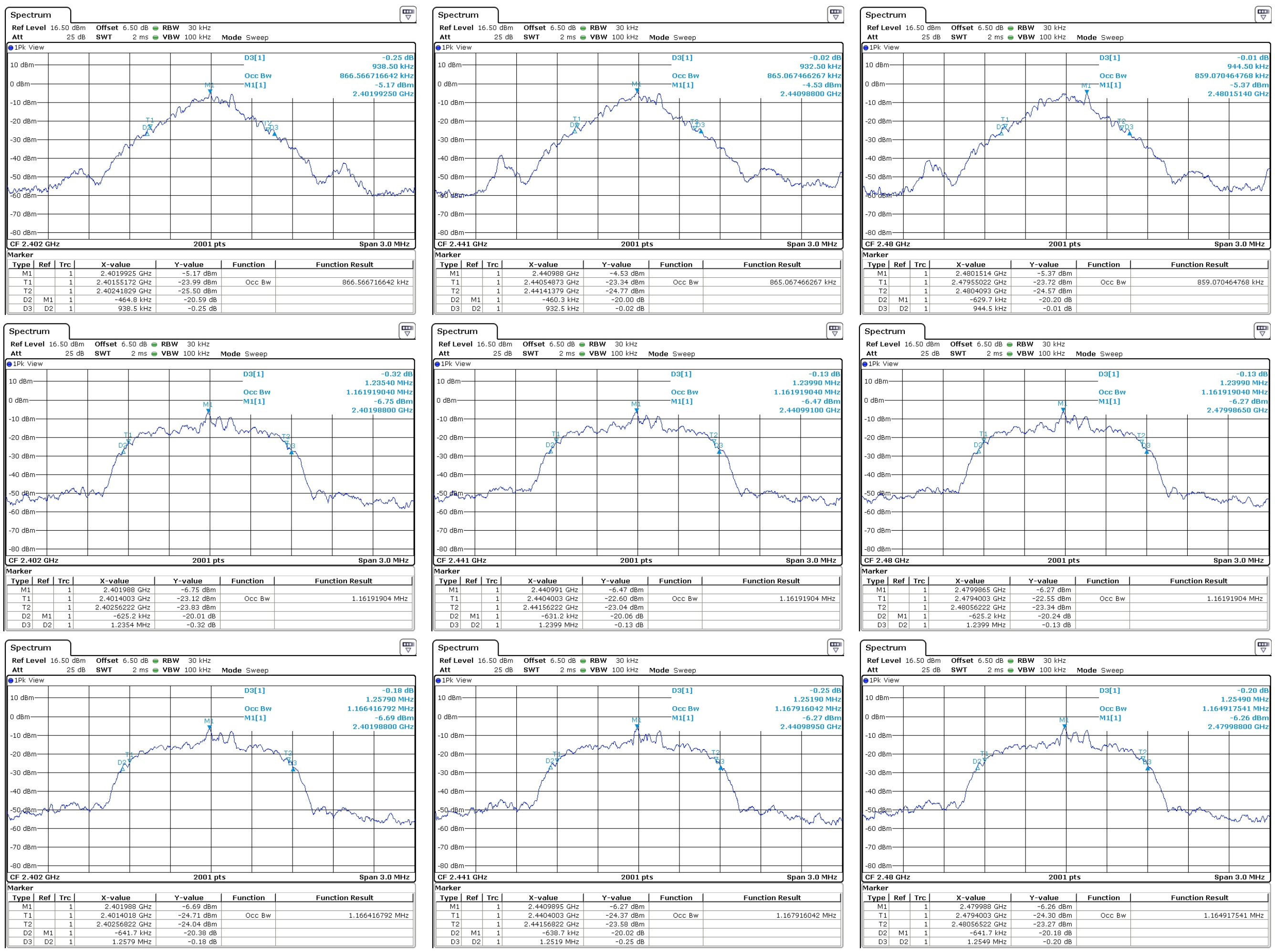

Figure 7: Intentional Emission Bandwidth.

3.2.4 Number of Hopping Channels

Frequency Hopping systems are required to employ a hopping sequence containing no less than 15 hopping channels. For this test, the EUT was enabled for data transmission with hopping. The number of channels measured is reported here in Table 6.

Table 6: Measured Number of Hopping Channels.

Frequency Range	Det	IF Bandwidth	Video Bandwidth		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	100/120 kHz	300 kHz	**Test Date:**	12-Nov-14
f > 1 000 MHz	Pk	3 MHz	3 MHz	**Test Engineer:**	Joseph Brunett
				EUT:	Clarion Head Unit
				Meas. Distance:	Conducted

Number of Hopping Channels						
Mode	Start Frequency (MHz)	Stop Frequency (MHz)	Number of Channels Observed (#)	Total Number (#)	Limit (#)	Pass/Fail
GFSK Hopping	2400.0	2483.5	79	79	15.0	Pass

Equipment Used: RSFSV30001

3.2.5 Channel Separation

Frequency hopping systems are required to employ hopping channel carrier frequencies separated by a minimum of 25 kHz or the two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater. For this test, the EUT was enabled for data transmission with hopping. The Carrier Separation was measured for low, mid, and high channels. Results of these measurements are shown in Table 7.

Table 7: Measured Channel Separation.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**	**Test Date:**	12-Nov-14
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	100/120 kHz	300 kHz	**Test Engineer:**	Joseph Brunett
f > 1 000 MHz	Pk	100 kHz	3 MHz	**EUT**	Clarion Head Unit
				Meas. Distance:	Conducted

Hopping Frequency Separation					
Mode	Low Channel Frequency (MHz)	High Channel Frequency (MHz)	Separation (MHz)	Separation Limit (kHz)	Pass/Fail
GFSK	2402.0	2403.0	1.002	>840	Pass
	2441.0	2442.0	1.004	>840	Pass
	2479.0	2480.0	1.000	>840	Pass
Pi/4DQPSK	Channel Separation is the same for all modulations in a Bluetooth transceiver. Only worst-case GFSK modulation was tested to demonstrate compliance.				
8DQPSK					

* Channel Separation Observed with the Device hopping over all available channels.

Equipment Used: RSFSV30001

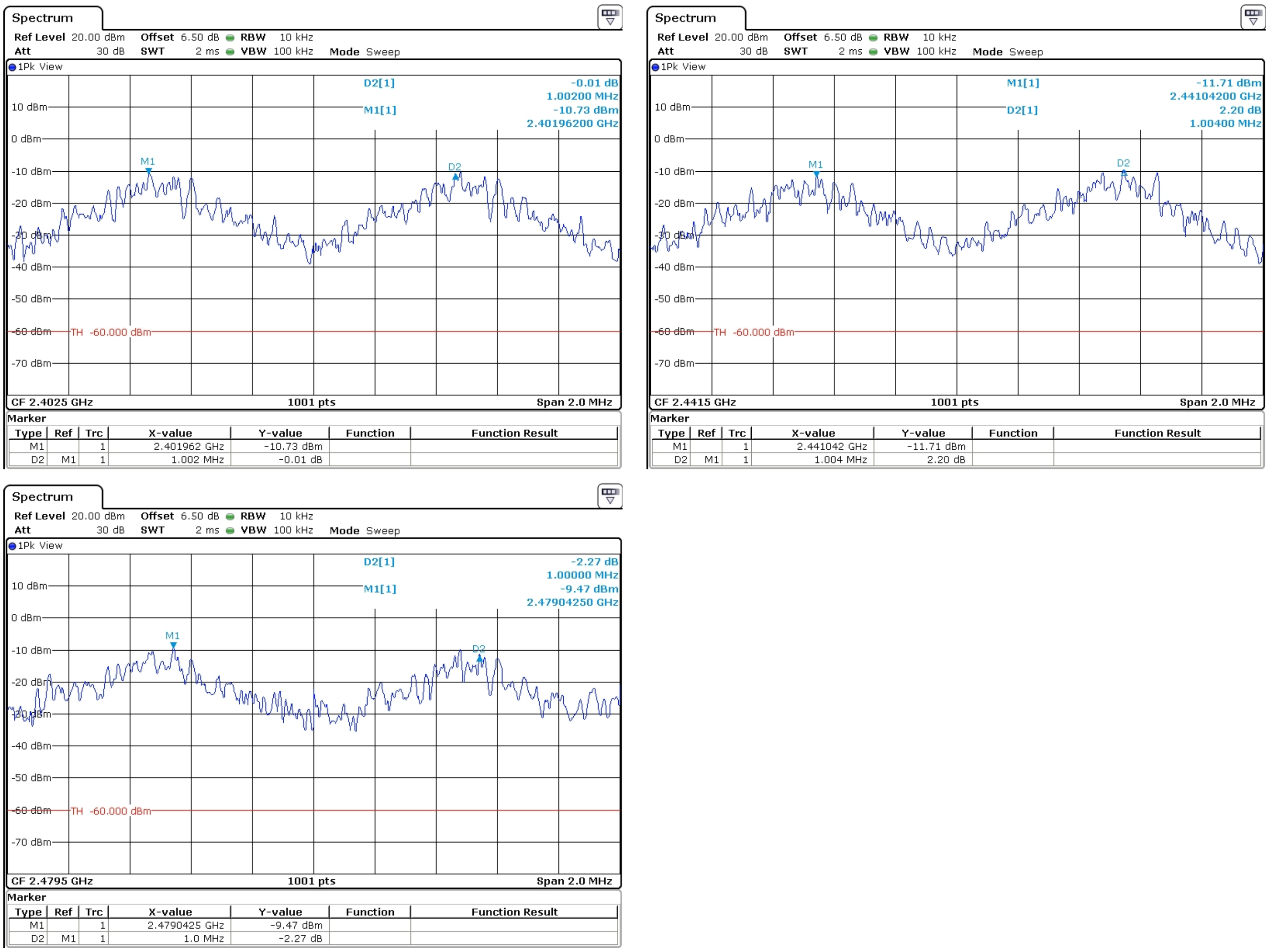

Figure 8: Measured Channel Separation.

3.2.6 Effective Isotropic Radiated Power

The EUT's radiated power is computed from antenna port conducted power measurements and the gain of the EUT antenna(s). Where the EUT is not sold with an antenna connector, a modified product has been provided including such. Peak conducted output power was measured directly from the EUT at the port where the antenna attaches. The test receiver bandwidth was set to be greater than the measured emission bandwidth of the EUT to capture the true peak. Antenna gain is either provided directly by the antenna manufacturer or measured by comparison between substitution based EIRP and conducted output power. Table 8 details the results of these measurements.

Table 8: Radiated Power Results.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Date:**	21-Aug-14
f > 1 000 MHz	Pk/Avg	3 MHz	5 MHz	**Test Engineer:**	Joseph Brunett
Equipment Used: HRN15001, RSFSV30001				**EUT:**	Clarion Head Unit
				Meas. Distance:	3m

												FCC/IC
Variant	Channel	Freq. MHz	Ant. Used	Ant. Pol.	Pr (Pk)** (dBm)	Ka (dB/m)	Kg (dB)	EIRP (Pk) (dBm)	Pout* (Pk) (dBm)	Ant Gain (dBi)	EIRP (Avg) Limit (dBm)	Pass (dB)
Large	L	2402.0	Horn LS	H/V	-43.5	21.4	0.0	-10.3	-0.4	-9.9	30.0	40.3
	M	2441.0	Horn LS	H/V	-43.0	21.5	0.0	-9.7	0.0	-9.7	30.0	**39.7**
	H	2480.0	Horn LS	H/V	-43.3	21.7	0.0	-9.8	-0.2	-9.6	30.0	39.8
Small	L	2402.0	Horn LS	H/V	-43.2	21.4	0.0	-10.0	-0.3	-9.7	30.0	40.0
	M	2441.0	Horn LS	H/V	-42.5	21.5	0.0	**-9.2**	**0.0**	-9.2	30.0	39.2
	H	2480.0	Horn LS	H/V	-43.6	21.7	0.0	-10.1	-0.1	-10.0	30.0	40.1
Variant	Channel	Freq. MHz	Supply Voltage	Ant. Pol.	Pr ** dBm	Ka dB/m	Kg dB	EIRP (Pk) dBm				
Small	M	2441.0	4.1	H/V	-42.7	21.5	0.0	-9.4				
		2441.0	3.9	H/V	-42.1	21.5	0.0	-8.8				
		2441.0	3.7	H/V	-42.5	21.5	0.0	-9.2				
		2441.0	3.5	H/V	-42.3	21.5	0.0	-9.0				
		2441.0	3.3	H/V	-42.6	21.5	0.0	-9.3				

* Measured conducted from the radio using conducted test sample.

** Measured radiated at 3 meter distance. Peak power observed in GFSK modulation.

3.3 Unintentional Emissions

3.3.1 Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 9. Measurements are performed to 10 times the highest fundamental operating frequency.

Table 9: Transmit Chain Spurious Emissions.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Date:**	21-Aug-14
f > 1 000 MHz	Pk/Avg	1 MHz	3 MHz	**Test Engineer:**	Joseph Brunett
				EUT:	Clarion Head Unit
				Mode:	Modulated (all modes)
				Meas. Distance:	3m

Equipment Used: HRN15001, HRNC001, HRNXN001, HRXB001, HRNKU001, HRNK001, RSFSV30001

FCC/IC

#	Freq. Start MHz	Freq. Stop MHz	Ant. Used	Ant. Pol.	Pr (Pk) dBm	Pr (Avg)* dBm	Ka dB/m	Kg dB	E3(Pk) dBμV/m	E3(Avg) dBμV/m	E3 Avg Lim dBμV/m	Pass dB	Comments
1	**Large Variant (with CD)**												
2	Fundamental Restricted Band Edge (Low Side)												
3	2390.0	2390.0	Horn LS	H/V	-70.9	-81.7	21.3	-0.4	57.8	47.0	54.0	**7.0**	all channels; max all; noise
4	Fundamental Restricted Band Edge (High Side)												
5	2483.5	2483.5	Horn LS	H/V	-71.0	-82.3	21.8	-0.4	58.2	46.9	54.0	7.1	all channels; max all; noise
6	Harmonic / Spurious Emissions												
7	4804.0	4804.0	Horn C	H/V	-74.2	-94.2	24.6	-0.8	58.2	38.2	54.0	15.8	
8	4805.0	4805.0	Horn C	H/V	-71.6	-91.6	24.6	0.2	59.8	39.8	54.0	14.2	
9	4806.0	4806.0	Horn C	H/V	-71.7	-91.7	24.6	1.2	58.7	38.7	54.0	15.3	
10	4000.0	6000.0	Horn C	H/V	-71.6	-91.6	24.9	-0.8	61.1	41.1	54.0	12.9	
11	6000.0	8400.0	Horn XN	H/V	-83.0	-91.0	27.1	-1.2	52.3	44.3	54.0	**9.7**	all channels; max all; noise
12	8400.0	12500.0	Horn X	H/V	-93.5	-103.2	32.0	-2.0	47.5	37.8	54.0	16.2	all channels; max all; noise
13	12500.0	18000.0	Horn Ku	H/V	-93.4	-102.8	35.4	-2.5	51.5	42.1	54.0	11.9	all channels; max all; noise
14	**Small Variant (no CD)**												
15	Fundamental Restricted Band Edge (Low Side)												
16	2390.0	2390.0	Horn LS	H/V	-71.1	-82.4	21.3	-0.4	57.6	46.3	54.0	7.7	all channels; max all; noise
17	Fundamental Restricted Band Edge (High Side)												
18	2483.5	2483.5	Horn LS	H/V	-71.4	-82.1	21.8	-0.4	57.8	47.1	54.0	**6.9**	all channels; max all; noise
19	Harmonic / Spurious Emissions												
20	4804.0	4804.0	Horn C	H/V	-71.9	-91.9	24.6	-0.8	60.5	40.5	54.0	13.5	
21	4805.0	4805.0	Horn C	H/V	-72.3	-92.3	24.6	0.2	59.1	39.1	54.0	14.9	
22	4806.0	4806.0	Horn C	H/V	-73.1	-93.1	24.6	1.2	57.3	37.3	54.0	16.7	
23	4000.0	6000.0	Horn C	H/V	-71.9	-91.9	24.9	-0.8	60.8	40.8	54.0	13.2	
24	6000.0	8400.0	Horn XN	H/V	-83.1	-91.1	27.1	-1.2	52.2	44.2	54.0	**9.8**	all channels; max all; noise
25	8400.0	12500.0	Horn X	H/V	-93.7	-103.2	32.0	-2.0	47.3	37.8	54.0	16.2	all channels; max all; noise
26	12500.0	18000.0	Horn Ku	H/V	-93.4	-102.8	35.4	-2.5	51.5	42.1	54.0	11.9	all channels; max all; noise
27	18000.0	25000.0	Horn K	H/V	-91.9	-101.6	33.4	-1.7	50.2	40.5	54.0	13.5	all channels; max all; noise
28													

*Avg computed from Pk measurement via duty cycle. If Pk measurement is noise, then Avg is measured via Avg detector.

3.3.2 Relative Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions relative to the fundamental in a 100 kHz receiver bandwidth (at the nominal voltage and temperature) are provided in Figure 9 below.

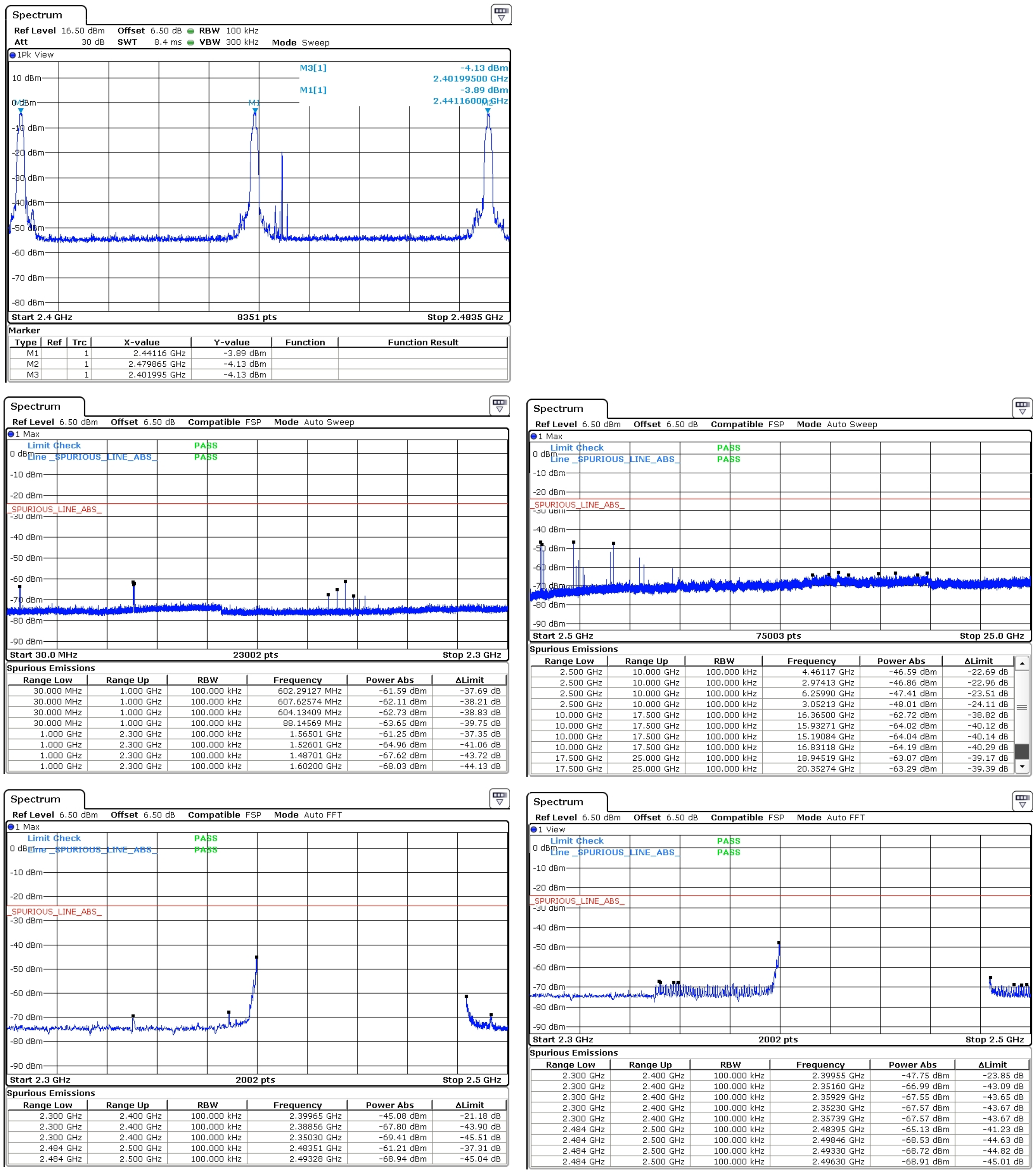

Figure 9: Conducted Transmitter Emissions Measured.

3.3.3 Radiated Receiver Spurious

The results for the measurement of radiated receiver spurious emissions (emissions from the receiver chain, e.g. LO or VCO) at the nominal voltage and temperature are reported in Table 10. Receive chain emissions are measured to 5 times the highest receive chain frequency observed, or 4 GHz, whichever is higher. If no emissions are detected, only those noise floor emissions at the LO/VCO frequency are reported.

Table 10: Receiver Chain Spurious Emissions ≥ 30 MHz.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Date:**	21-Aug-14
f > 1 000 MHz	Pk/Avg	1 MHz	3 MHz	**Test Engineer:**	Joseph Brunett
Equipment Used: HRN15001, RSFSV30001				**EUT:**	Clarion Head Unit
				Meas. Distance:	3m

#	Freq. MHz	Ant. Used	Ant. Pol.	Pr (Pk) dBm	Pr (QPk/Avg) dBm*	Ka dB/m	Kg dB	E3(Pk) dBμV/m	E3(Avg) dBμV/m	FCC/IC E3lim dBμV/m	CE E3lim dBμV/m	Pass dB	Comments
													FCC/IC
1	2402.0	Horn LS	H/V	-82.1		21.4	0.0	46.3		54.0		**7.7**	max all, noise
2	2441.0	Horn LS	H/V	-83.9		21.5	0.0	44.6		54.0		9.4	max all, noise
3	2480.0	Horn LS	H/V	-83.2		21.7	0.0	45.5		54.0		8.5	max all, noise
4													

*QPk detection below 1 GHz, Avg detection at or above 1 GHz with receiver bandwidth as specified at top of table.