Testing Tomorrow's Technology

Application
For

Part 2, Subpart J, Paragraph 2.907 Equipment Authorization of Certification for an Intentional Radiator per Part 15, Subpart C, paragraph 15.247

and

IC Radio Standards Specification: RSS-210

Permissive Change

For the

RFM

Model(s): DNT90C, DNT90CA, DNT90P and DNT90PA

FCC ID: HSW-DNT90
IC: 4492A-DNT90

UST Project: 14-0286
Issue Date: December 3, 2014

Total Pages in This Report: 50

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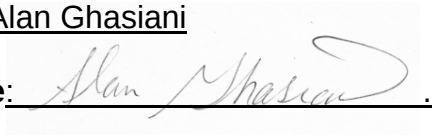
I certify that I am authorized to sign for the Test Agency and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: Alan Ghasiani

Name:  .

Title: Consulting Engineer, President

Date: December 3, 2014

NVLAP LAB CODE 200162-0

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MEASUREMENT TECHNICAL REPORT

COMPANY NAME: RFM

MODEL(S): DNT90C, DNT90CA, DNT90P and DNT90PA

FCC ID: HSW-DNT90

IC ID: 4492A-DNT90

DATE: December 3, 2014

This report concerns (check one): Original grant
Class II change [X]

Equipment type: FHSS Transceiver Module

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until: _____N/A_____
date
agrees to notify the Commission by N/A
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

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1 General Information

1.1 Purpose of this Report

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210 for a Class II Permissive Change to replace an obsolete power amplifier and external transmit/receive switch with a new power amplifier that has a power amplifier and an intergraded Transmit/Receive switch. The functionality will remain unchanged - PA followed by T/R switch - only the physical location of the switch will be different. The output power of the new design is set at production to match that of the original grant. No additional changes are being made to the RF circuitry.

Based on the changes above the output power level was retested along with other radio conducted measurements. As long as measurements were no more than 0.5 dB above the previously measurement maximum values the data was deemed acceptable. Please see the test report for test results.

1.2 Characterization of Test Sample

The sample used for testing was received by US Tech on December 1, 2013 in good operating condition.

1.3 Product Description

The DNT90 is a frequency hopping spread spectrum (FHSS) transceiver operating in the 902-928 MHz frequency band which provides for wireless connectivity for point-to-point, point-to-multipoint and store-and-forward radio applications. The DNT90 comes in multiple models, The DNT90C, DNT90CA, DNT90P and DNT90PA. The models are electrically identical and differ only minor variations. The DNT90C is a castellated version and the DNT90P is a pin version for socket mounting. The DNT90CA and DNT90PA are versions with an on board antenna and the U.FL connector deleted from the circuit. All version have been tested and approved in prior submittals. For this evaluation the DNT90P was tested as a representative sample and is referred to herein as DNT90.

Technical details:
Band of operation: 902-928 MHz
Number of hopping channels: 52
Channel spacing: 480 KHz
Output power: 22 dBm
Over the air data rate: 100 Kbps
Modulation format: Gaussian filtered FSK
User interface rates: 9600 baud up to 230 Kbps
Receiver sensitivity: -100 dBm at 100 Kbps
Certification sub-type Frequency Hopper (>50 channels)
Emission Designator: F1D
Antennas: 5 dBi Omni(dipole), 6 dBi Yagi, -1 dBi chip antenna
RF connector: UFL or PCB

1.4 Duty Cycle Correction

The test was not performed for this evaluation because the duty cycle parameters remained the same as those previously approved.

1.5 Configuration of Tested System

The Test Sample was tested per *ANSI C63.4:2009, Methods of Measurement of Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2009)* for FCC subpart B Digital equipment Verification requirements and per FCC Public Notice DA 00-705 released March 30, 2000 for Frequency Hopping Spread Spectrum Systems operating under section 15.247. Also, Marker-Delta Method was followed to measure the upper band-edge.

Digital RF conducted and radiated Verification emissions data (FCC 15.107 and 109) below 1 GHz were taken with the measuring receiver (or spectrum analyzer's) resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements performed above 1.0 GHz were made with a RBW of 1 MHz. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process.

A list of EUT and Peripherals is found in Table 1 below. A block diagram of the tested system is shown in Figure 1. Test configuration photographs for spurious and fundamental emissions are provided in separate Appendices.

1.6 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA 30004. This site has been fully described and registered with the FCC. Its registration number is 186022. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 9900A-1.

Table 1 . EUT and Peripherals

PERIPHERAL MANUFACTURER.	MODEL NUMBER	SERIAL NUMBER	FCC ID	CABLES P/D
(EUT) RFM	DNT90P	Engineering Sample	HSW-DNT90	None
Switching Power Supply GlobTek, Inc.	--	02106248103	None	1 m U P
Evaluation Board RFM	DNT90 Developer Kit	0007D6	None	1 m U D
Antenna	See Table 4	-	-	-

2 Tests and Measurements

2.1 Test Equipment

Table 2 below lists test equipment used to evaluate this product. Model numbers, serial numbers and their calibration status are included herewith.

Table 2 . Test Instruments

TEST INSTRUMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	E4407B	Agilent	US41442935	11/8/2013 Ext. 2/8/15
BICON ANTENNA	3110	EMCO	9307-1431	2/11/2013 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9110-3236	11/19/2014 2 yr.
HORN ANTENNA	3115	EMCO	9107-3723	7/8/2014 2 yr.
LOOP ANTENNA	SAS200/562	A.H. Systems	142	9/12/2013 2 yr.
PREAMP	8447D	Hewlett Packard	1937A02980	2/6/2014
PREAMP	8449B	Hewlett Packard	3008A00480	2/6/2014
LISN (x2)	9247-50-TS-50-N	Solar Electronics	955824 & 955825	3/20/2014

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.2 Modifications to EUT Hardware

No modifications were made by US Tech in order to bring the EUT into compliance with FCC Part 15, Subpart C Intentional Radiator Limits for the transmitter portion of the EUT or the Subpart B Unintentional Radiator Limits (Receiver and Digital Device) Requirements.

2.3 Number of Measurements for Intentional Radiators (15.31(m))

Measurements of intentional radiators or receivers shall be performed and reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in Table 3 as follows.

Table 3 . Number of Test Frequencies for Intentional Radiators

Frequency Range over which the device operates	Number of Frequencies	Location in the Range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near the top 1 near the bottom
Greater than 10 MHz	3	1 near top 1 near middle 1 near bottom

Because the EUT operates over 902 MHz to 928 MHz, 3 test frequencies will be used.

2.4 Frequency Range of Radiated Measurements (Part 15.33)

2.4.1 Intentional Radiator

The spectrum shall be investigated for the intentional radiator from the lowest RF signal generated in the EUT, without going below 9 kHz to the 10^{th} harmonic of the highest fundamental frequency generated or 40 GHz, whichever is the lowest.

2.4.2 Unintentional Radiator

For the digital device, an unintentional radiator, the frequency range shall be 30 MHz to 1000 MHz, or to the range specified in Part 15.33(b)(1) but not more than the 5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower.

2.5 Measurement Detector Function and Bandwidth (CFR 15.35)

The radiated and conducted emissions limits shown herein are based on the following:

(a) On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified.

(b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

For details refer to CFR 15.35 (a) and (b).

2.6 EUT Antenna Requirements (CFR 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

RFM will sell the RF Module with only the previously approved antennas.

Table 4 . Allowed Antenna(s)

MANUFACTURER	TYPE OF ANTENNA	MODEL	REPORT REFERENCE	GAIN dB_i
See User's Manual for antenna details.				

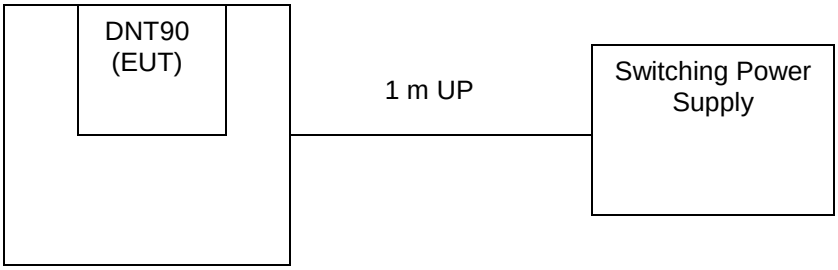


Figure 1 - Test Configuration

2.7 Intentional Radiator, Radiated Emissions (Antenna Conducted) (CFR 15.247(d)) (IC RSS 210, A2.9 (a))

The EUT was put into a continuous-transmit mode of operation and tested per FCC Public Notice DA 00-705, for conducted out of band emissions emanating from the antenna port over the frequency range of 30 MHz to 10.0 GHz. A conducted scan was performed on the EUT to identify and record spurious signals that were related to the transmitter. Antenna Conducted Emissions of a significant magnitude that fell within restricted bands were then measured as radiated emissions on the OATS. The conducted emissions graphs are found in figures 2 through 7 below.

For radiated measurements, the EUT was set into a continuous transmission mode. Below 1 GHz, the RBW of the measuring instrument was set equal to 120 kHz. Peak measurements above 1 GHz were measured using a RBW = 1 MHz, with a VBW ≥ RBW. The results of radiated spurious emissions falling within restricted bands are given in Table 5 and 6 below.

For Average Voltage measurements above 1 GHz, the emissions were measured using RBW = 1 MHz and VBW = 10 Hz. For a pulse-modulated transmitter, the EUT's average emissions are further modified by adding to them the worst-case duty cycle, determined by adding the EUT's total pulse widths (on time) over a 100 ms period and dividing by 100 ms.

On the OATS, the EUT was mounted on top of a non-conductive table, 80 cm above the floor, by placing it in the X-Z plane along the Z axis with its bottom cover in parallel with the ground. The front of the EUT faced the measurement antenna located 3 meters away. Each signal measured was maximized by raising and lowering the receive antenna between 1 and 4 meters in height while monitoring the ever changing spectrum analyzer display (with channel A in the Clear-Write mode and channel B in the Max-Hold mode) for the largest signal visible. That exact antenna height where the signal was maximized was recorded for reproducibility purposes. Also, the EUT was rotated about its Y-axis while monitoring the Spectrum Analyzer display for maximum. The EUT azimuth was recorded for reproducibility purposes. The EUT was measured when both maxima were simultaneously satisfied. Data is shown in the tables that follow.

2 Test and Measurements (Cont'd)

2.8 Intentional Radiator, Radiated Emissions (CFR 15.209, 15.247(d)) (IC RSS 210, A2.9 (a))

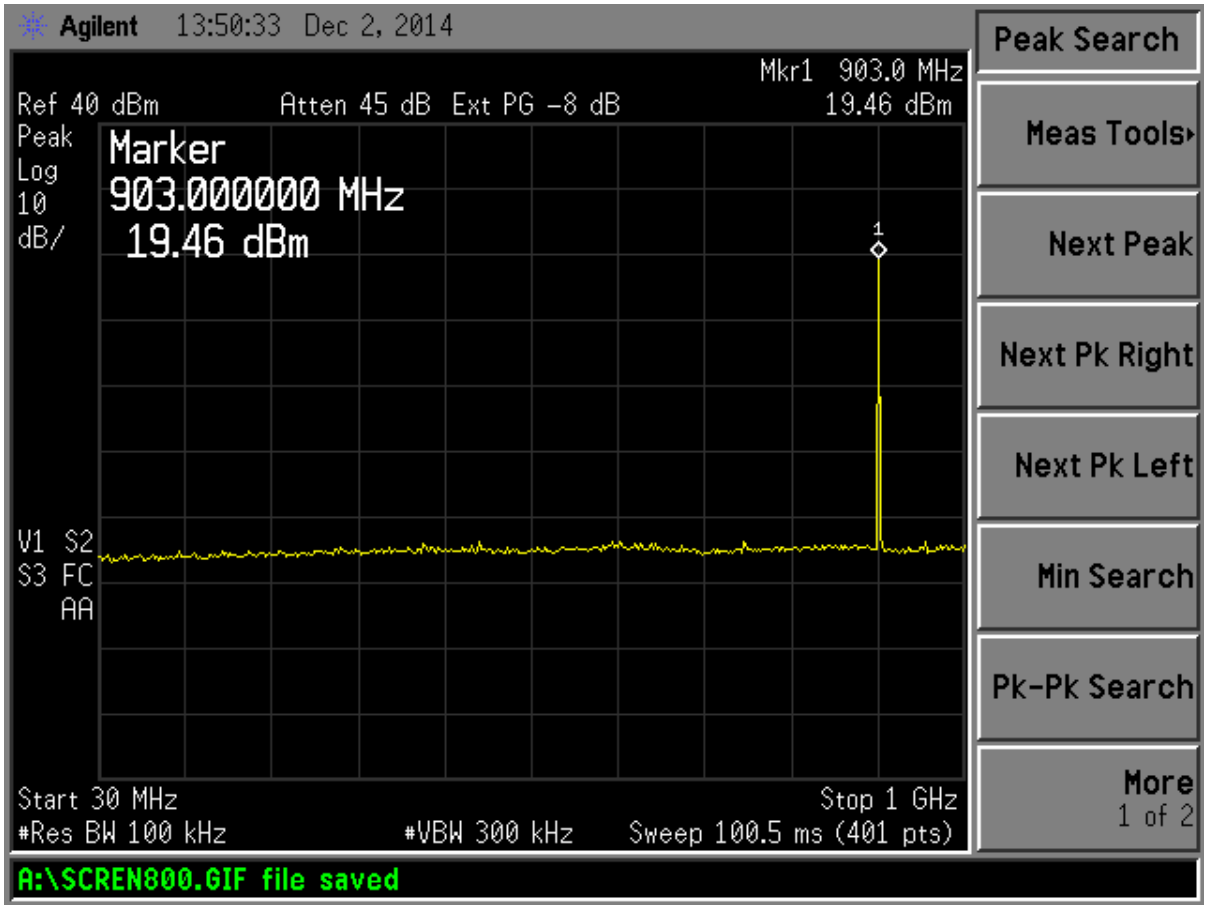


Figure 2 - Antenna Conducted Spurious Emissions – Low Channel, Part 1

Note: Large Signal shown is Fundamental Frequency

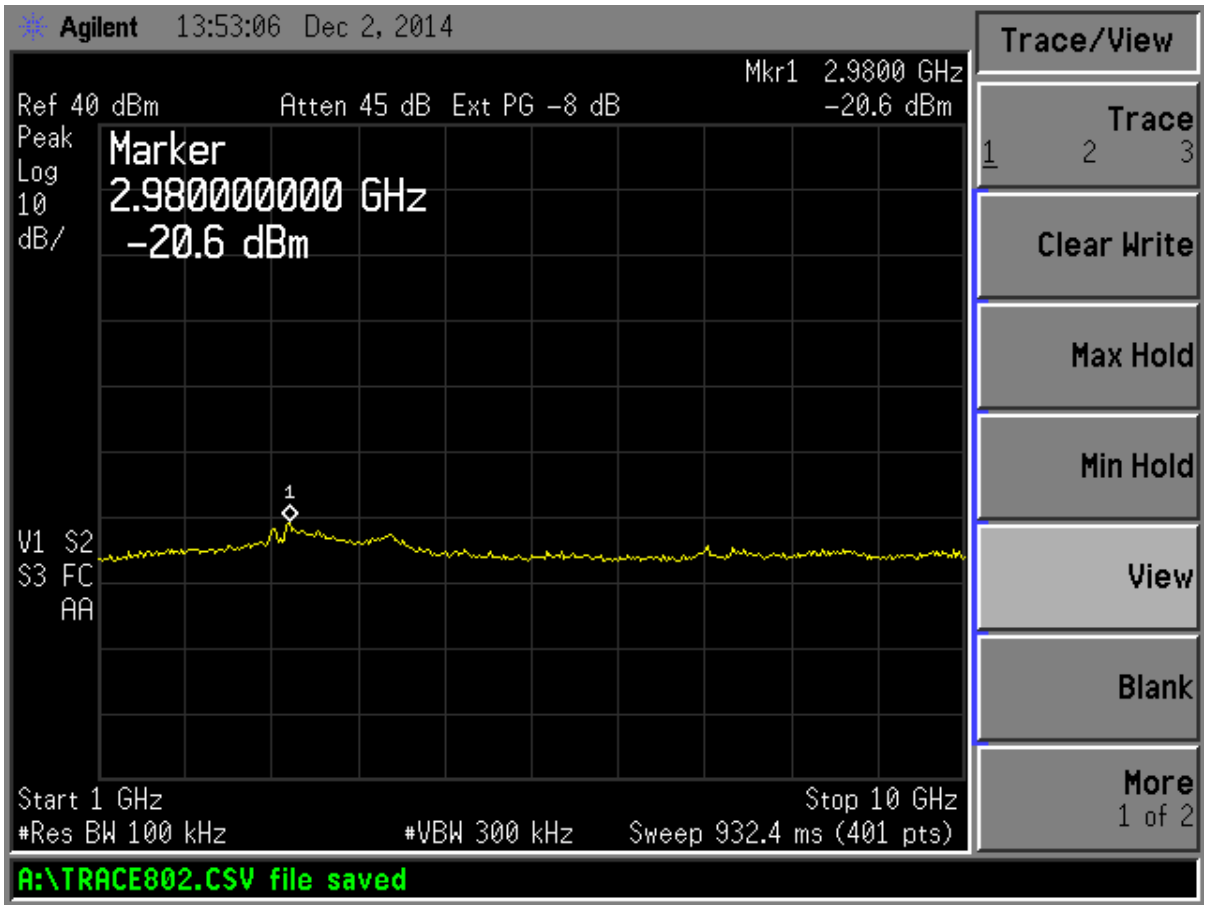


Figure 3 - Antenna Conducted Spurious Emissions – Low Channel, Part 2

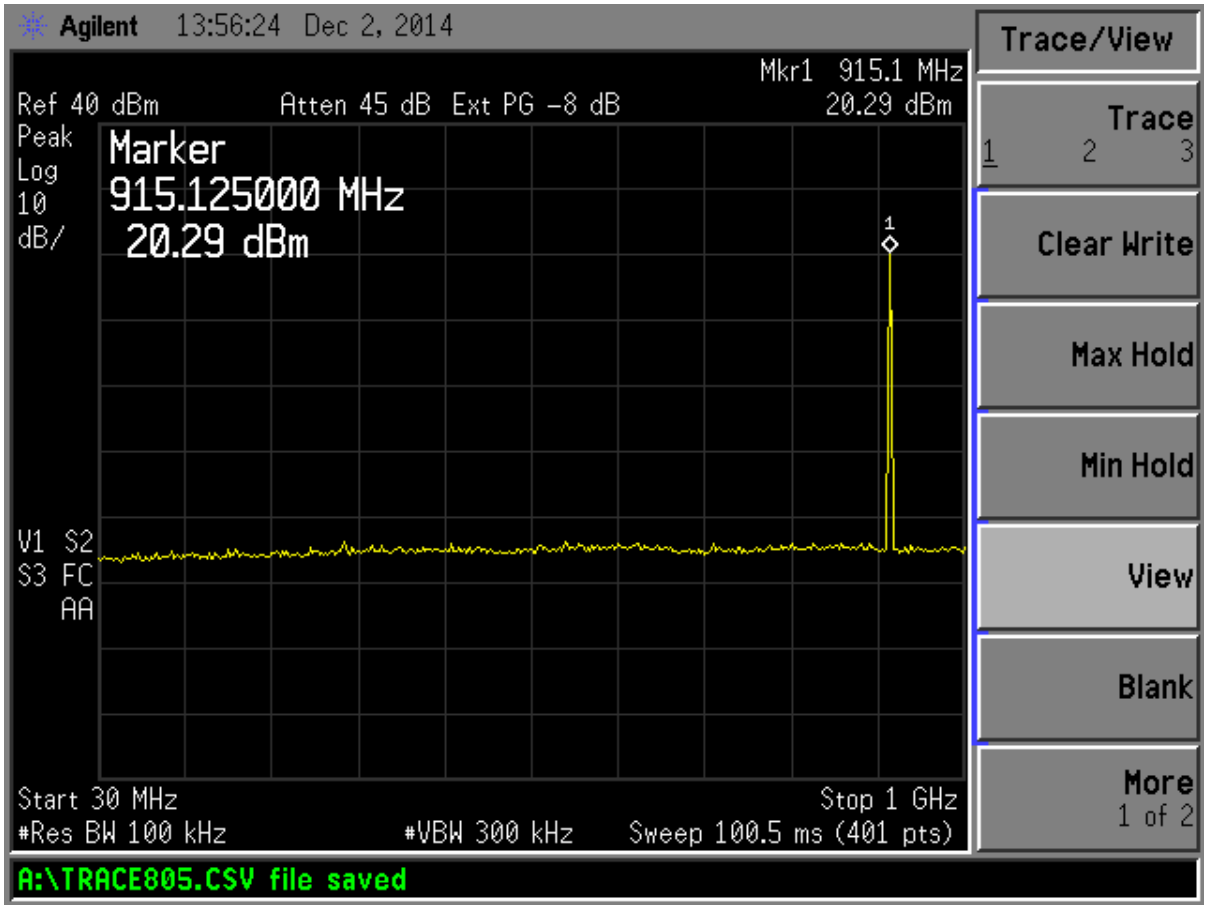


Figure 4 - Antenna Conducted Spurious Emissions - Mid Channel, Part 1

Note: Large Signal shown is Fundamental Frequency

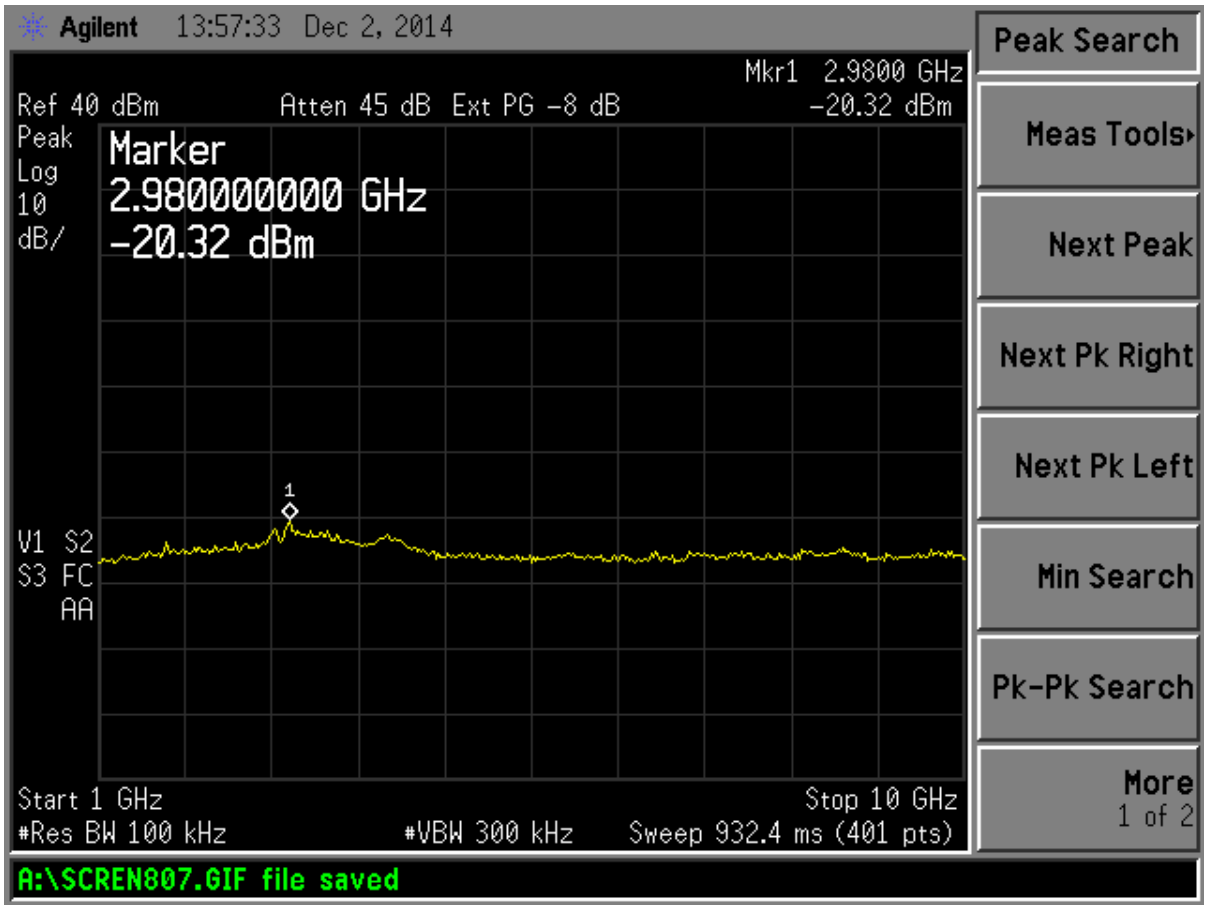


Figure 5 - Antenna Conducted Spurious Emissions – Mid Channel, Part 2

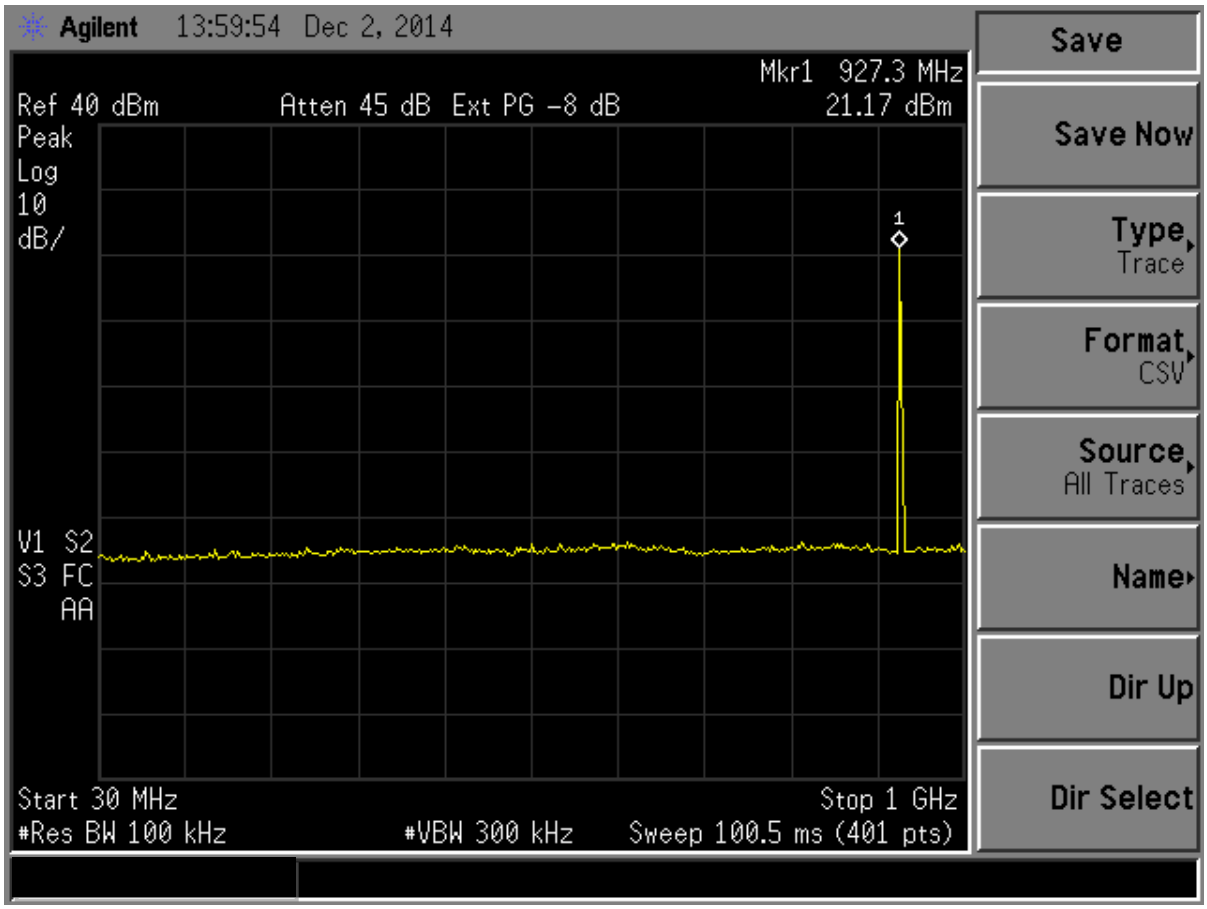


Figure 6 - Antenna Conducted Spurious Emissions – High Channel, Part 1

Note: Large signal shown represents Fundamental Frequency

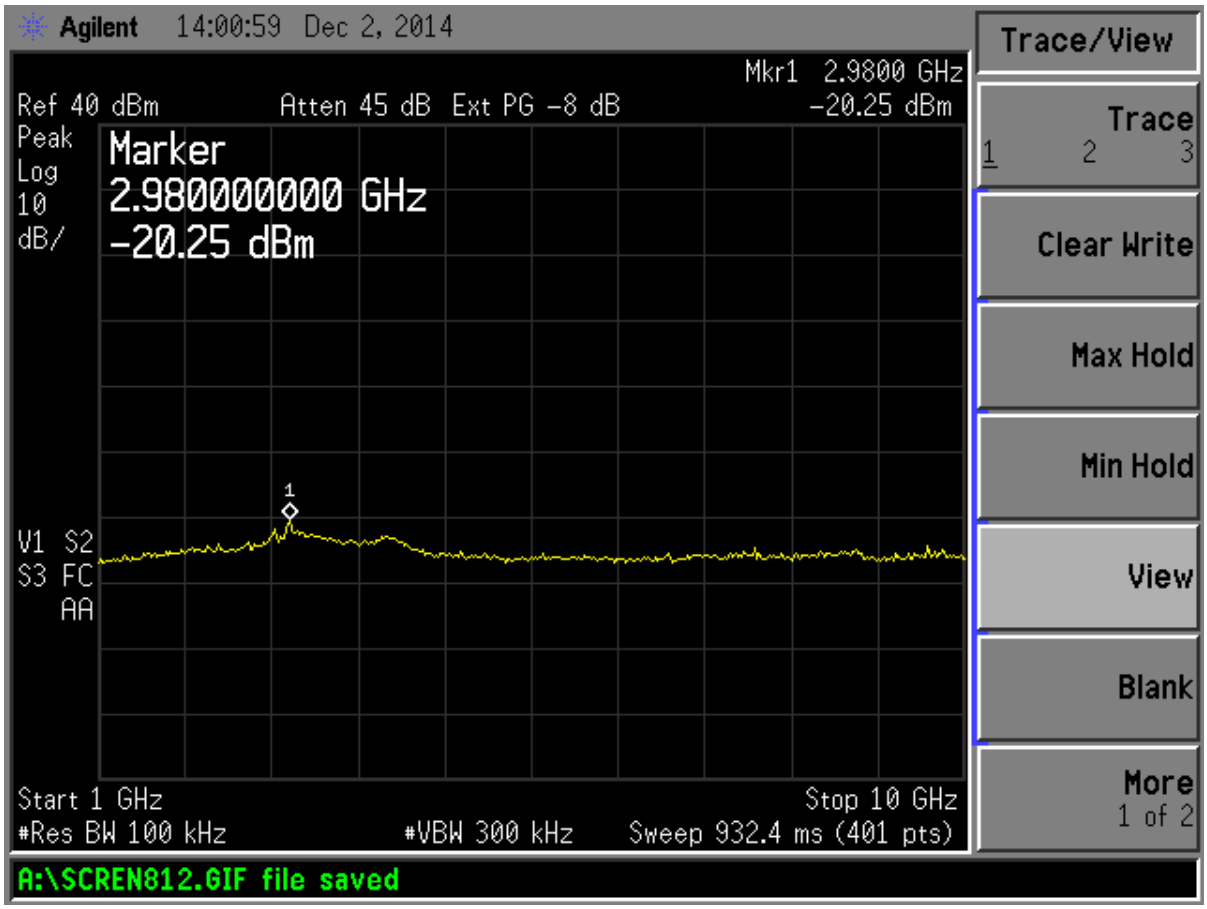
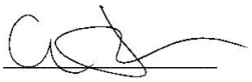


Figure 7 - Antenna Conducted Spurious Emissions - High Channel, Part 2

Table 5 . Peak Radiated Harmonic & Spurious Emissions

Radiated Harmonic and Spurious Emissions								
Tested By: CF	Test: FCC Part 15, Para 15.247(d)				Client: RFM			
	Project: 14-0286				Model: DNT90			
Frequency (MHz)	**Test Data (dBuV)**	**Additional Factor**	**AF+CL-PA (dB/m)**	**Corrected Results (dBuV/m)**	**PEAK Limits (dBuV/m)**	**Distance / Polarization**	**Pass Margin (dB)**	**Detector PK / AVG**
The test was not performed. The conducted output power of this DNT90 is within 0.5 dB of pervious output power level.								

SAMPLE CALCULATION: N/A

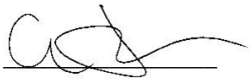
Test Date: December 2, 2014
Tested By
Signature: 

Name: Carrie Fincannon

Table 6. AVG Radiated Harmonic & Spurious Emissions

Radiated Harmonic and Spurious Emissions								
Tested By: CF	Test: FCC Part 15, Para 15.247(d)				Client: RFM			
	Project: 14-0286				Model: DNT90			
Frequency (MHz)	**Test Data (dBuV)**	**Additional Factor**	**AF+CL-PA (dB/m)**	**Corrected Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Distance / Polarization**	**Pass Margin (dB)**	**Detector PK / AVG**
The test was not performed. The conducted output power of this DNT90 is within 0.5 dB of pervious output power level.								

SAMPLE CALCULATION:N/A

Test Date: December 2, 2014
Tested By
Signature:  Name: Carrie Fincannon

2.12 Maximum Peak Conducted Output Power (CFR 15.247 (b) (3))

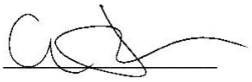
The DNT90 module, the transmitter, was programmed to operate at a maximum of +22 dBm across the bandwidth.

Peak power within the band 902 MHz to 928 MHz was measured per FCC KDB Publication DA 00-705 as an Antenna Conducted test with a spectrum analyzer by connecting the spectrum analyzer directly, via a short RF cable, to the antenna output terminals on the EUT. The spectrum analyzer was set for an impedance of 50 Ω with the RBW set greater than the 20 dB bandwidth of the EUT, and the VBW ≥ RBW. The loss of the short cable is <1.0 dB and an 8.0 dB attenuator was also used.

Antenna Conducted Output Power was measured at Low Channel, Mid Channel and High Channel frequencies.

Table 7. Peak Antenna Conducted Output Power per Part 15.247 (b)(1)

Frequency of Fundamental (MHz)	Corrected Measurement (dBm)	(mW)	FCC Limit (mW Maximum)
Low Band (902.61 MHz)	19.69	93.11	1000
Mid Band (915.19 MHz)	20.63	115.61	1000
High Band (927.24 MHz)	21.52	141.91	1000

Test Date: December 2, 2014
Tested By
Signature:  Name: Carrie Fincannon

2.12 Peak Power Output (CFR 15.247 (b)(3))

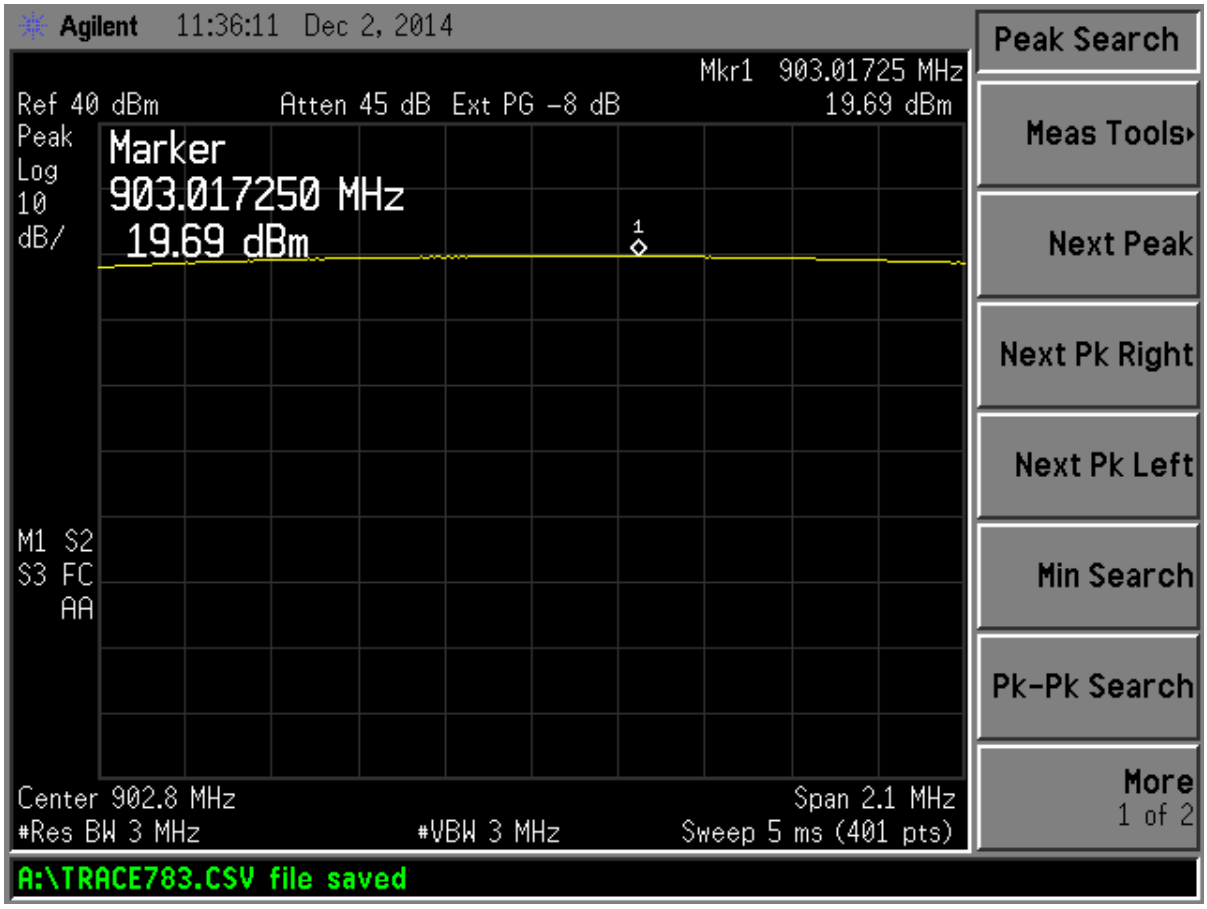


Figure 8 - Peak Antenna Conducted Output Power, Low Channel

2.12 Peak Power Output (CFR 15.247 (b)(3))

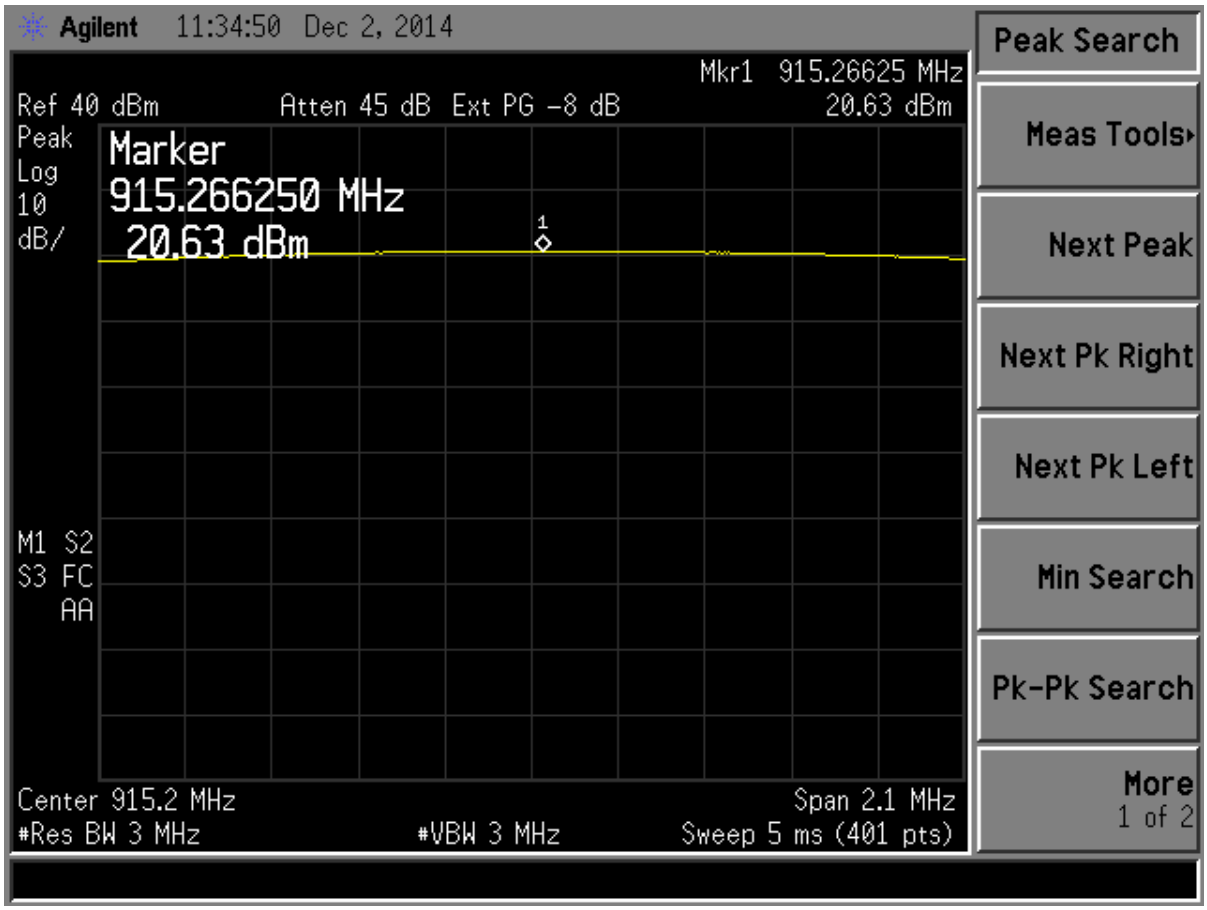


Figure 9 - Peak Antenna Conducted Output Power, Mid Channel

2.12 Peak Power Output (CFR 15.247 (b)(3))

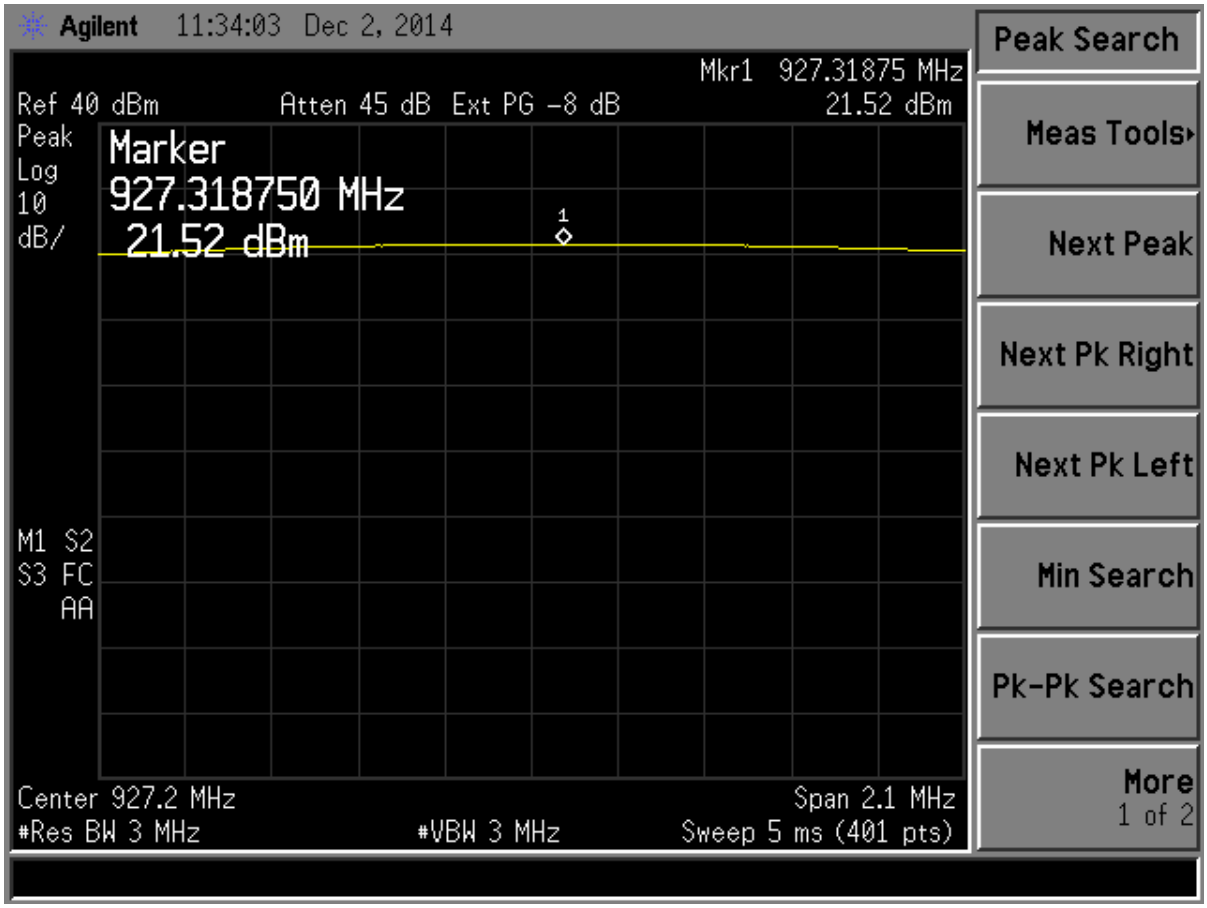


Figure 10 - Peak Antenna Conducted Output Power, High Channel

2.9 Band Edge Measurements – (CFR 15.247 (d))

Band Edge measurements are made with the EUT initially operating on the Lowest Channel and then operating on the Highest Channel within its band of operation. Antenna port conducted measurements are performed to demonstrate compliance with the requirement of 15.247(d) that all emissions outside of the band edges be attenuated by at least 20 dB when compared to its highest in-band value (contained in a 100 kHz band).

The measurement was conducted in the following manner: set the spectrum analyzer frequency span large enough (usually around 3 MHz) to capture the peak level of the emission operating on the channel closest to the band edge as well as any modulation products falling outside of the authorized band of operation. Conducted measurements are performed with RBW ≥1% of the frequency span. In all cases, the VBW is set ≥ RBW. This procedure is similar to FCC Docket # DA 00-705. This measurement was performed with the EUT continuously transmitting on the low and high channels as well as in normal use mode (frequency hopping ON).

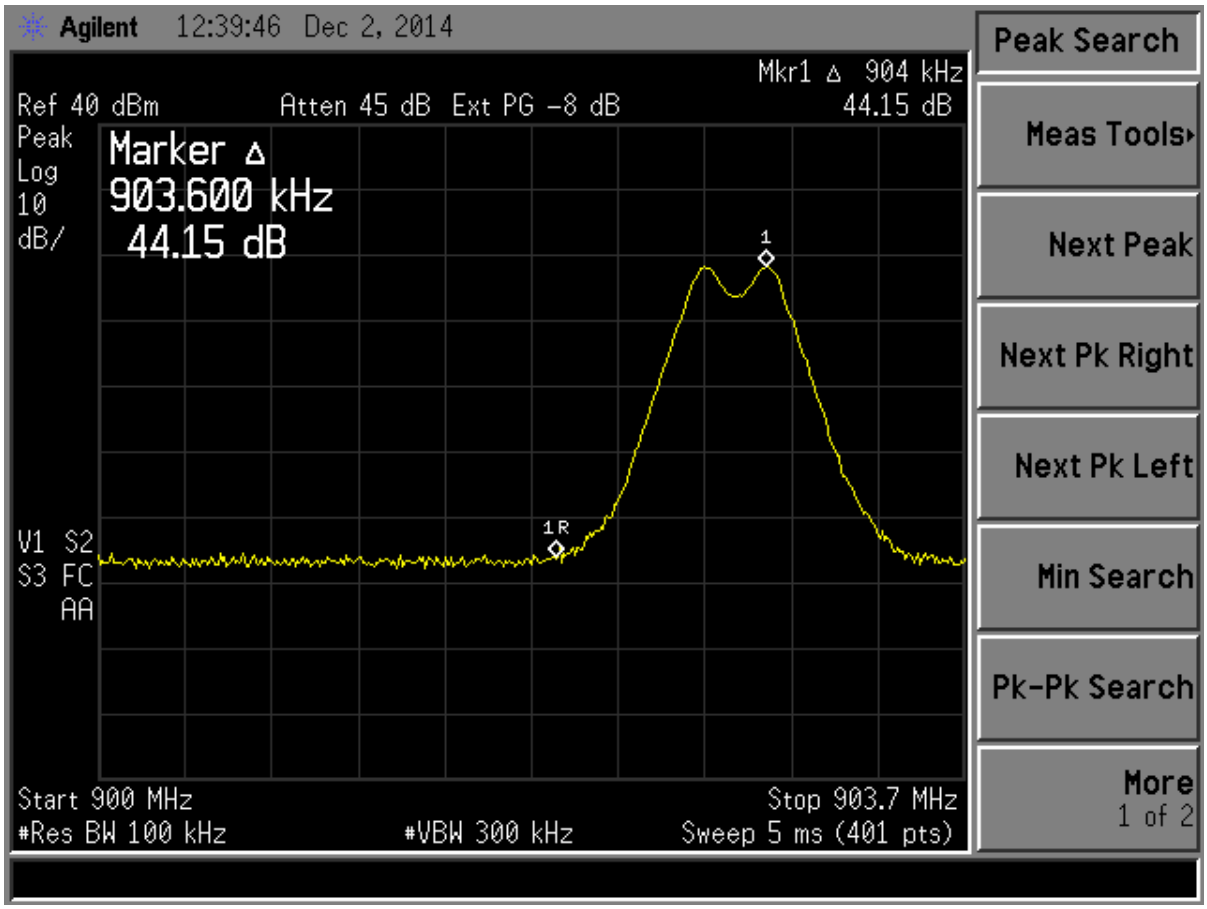


Figure 11 - Conducted Band Edge Compliance – Low Channel

Measured Delta (Figure 11)	44.15	dB
-Limit	20.00	dB
Margin from fundamental	24.15	dB

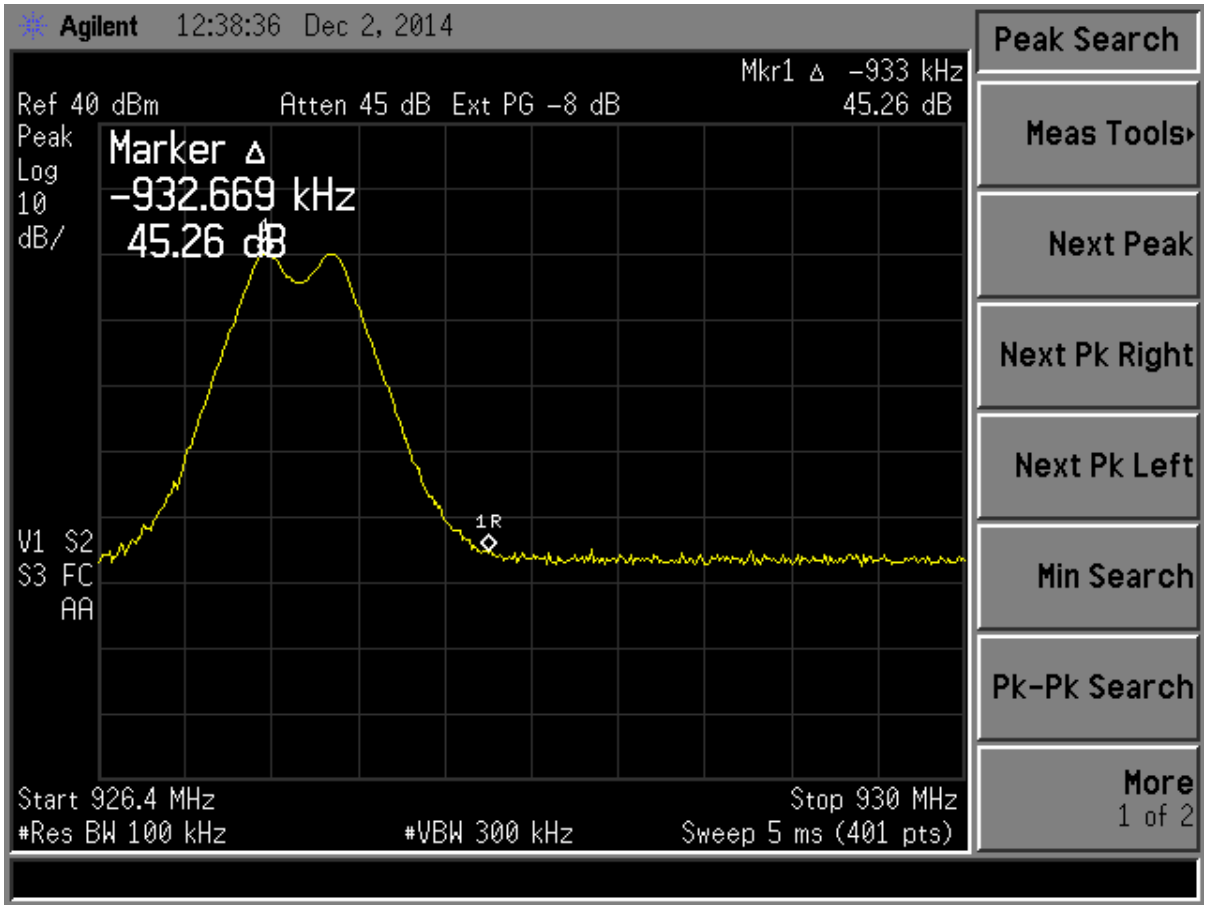


Figure 12 - Conducted Band Edge Compliance – High Channel

Measured Delta (Figure 12)	45.26	dB
-Limit	20.00	dB
Margin from fundamental	25.26	dB

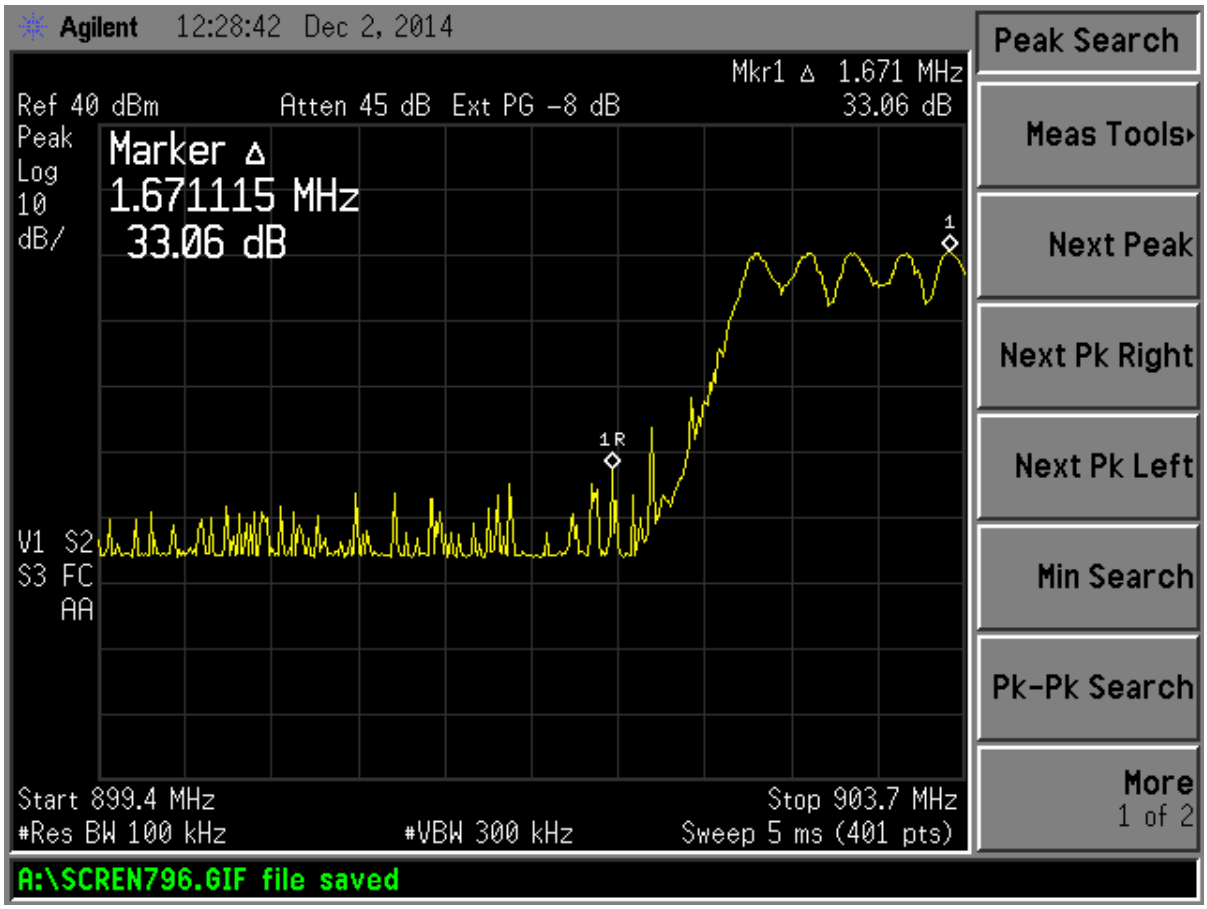


Figure 13 - Conducted Band Edge Compliance – Low Channel - Hopping

Measured Delta (Figure 113	33.06	dB
-Limit	20.00	dB
Margin from fundamental	13.06	dB

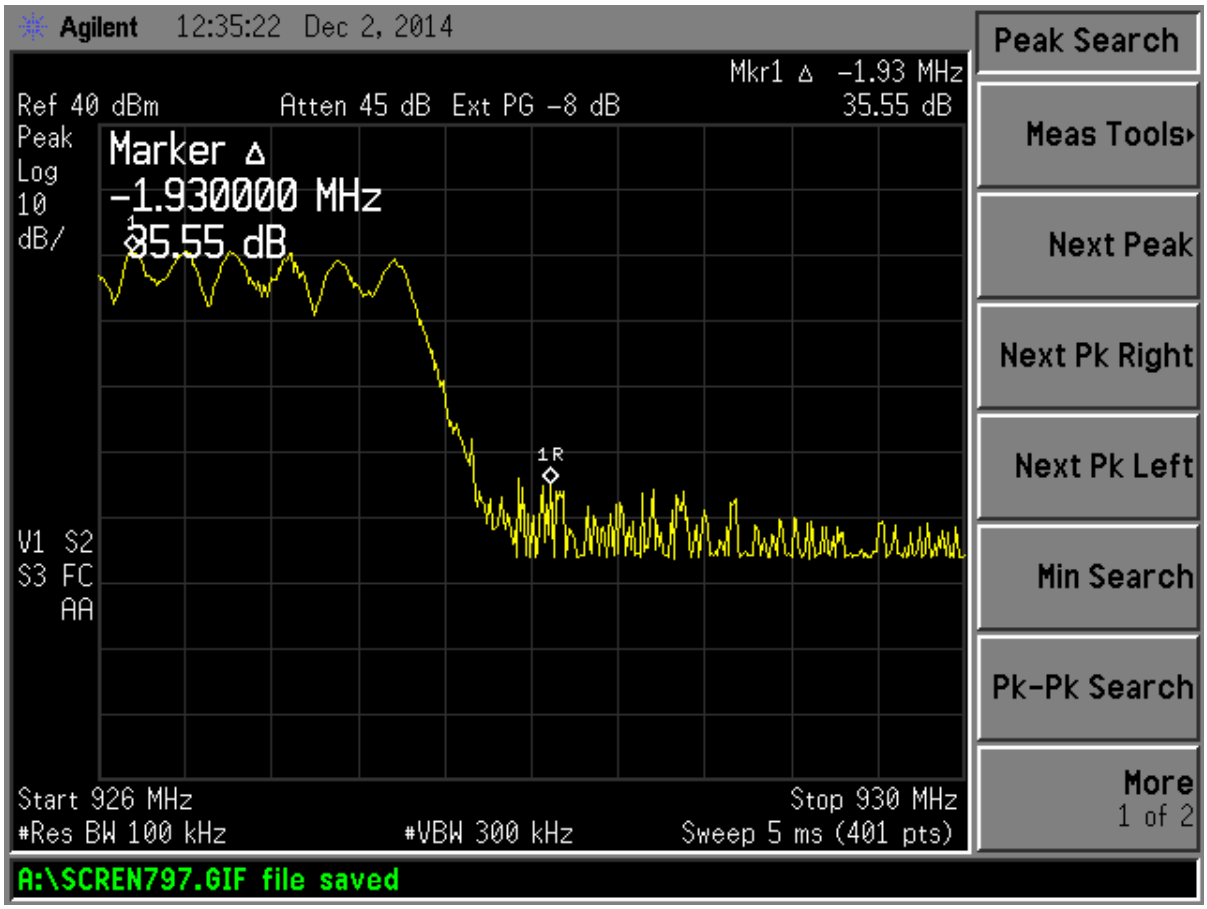


Figure 14 - Conducted Band Edge Compliance – High Channel

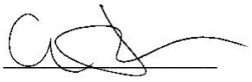
Measured Delta (Figure 14)	35.55	dB
-Limit	20.00	dB
Margin from fundamental	15.55	dB

2.10 20 dB Bandwidth Measurement per CFR 15.247, (IC RSS 210, A8.1)

The EUT antenna port was connected to a spectrum analyzer having a 50 Ω input impedance. Measurements were performed similar to the method of FCC DA 00-705 for a bandwidth of 20 dB. The RBW was set to ≥ 1/100 of the manufacturers claimed RBW and with the VBW ≥ RBW. The results of this test are given in Table 9 and Figures 15 through 17.

Table 8. 20 dB Bandwidth Measurement

Frequency (MHz)	20 dB Bandwidth kHz	99% Occupied Bandwidth (kHz)
902.75	414.86	409.01
915.24	414.55	407.78
927.24	415.44	409.70

Test Date: December 2, 2014
Tested By
Signature:  Name: Carrie Fincannon

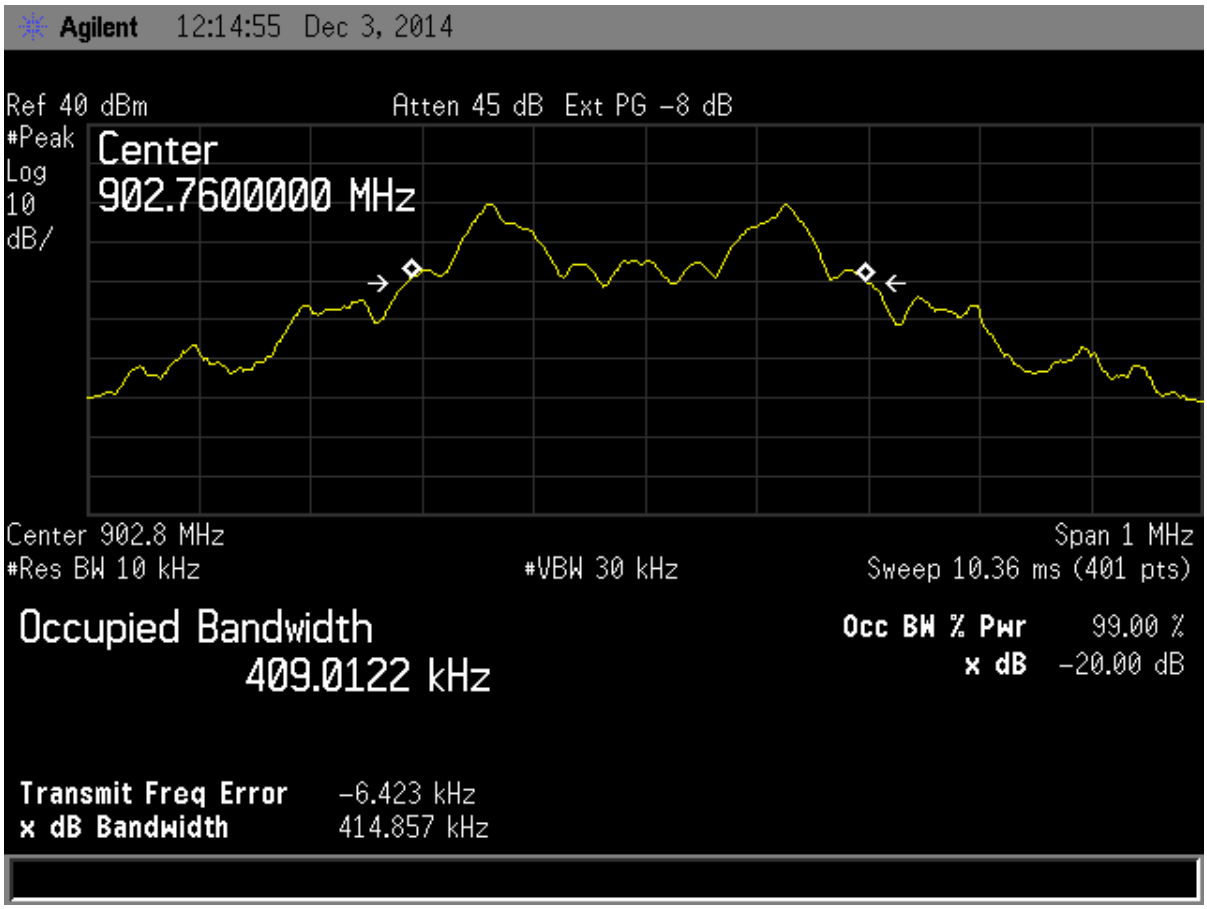


Figure 15 - Low Channel - 20 dB and 99 % Occupied Bandwidth

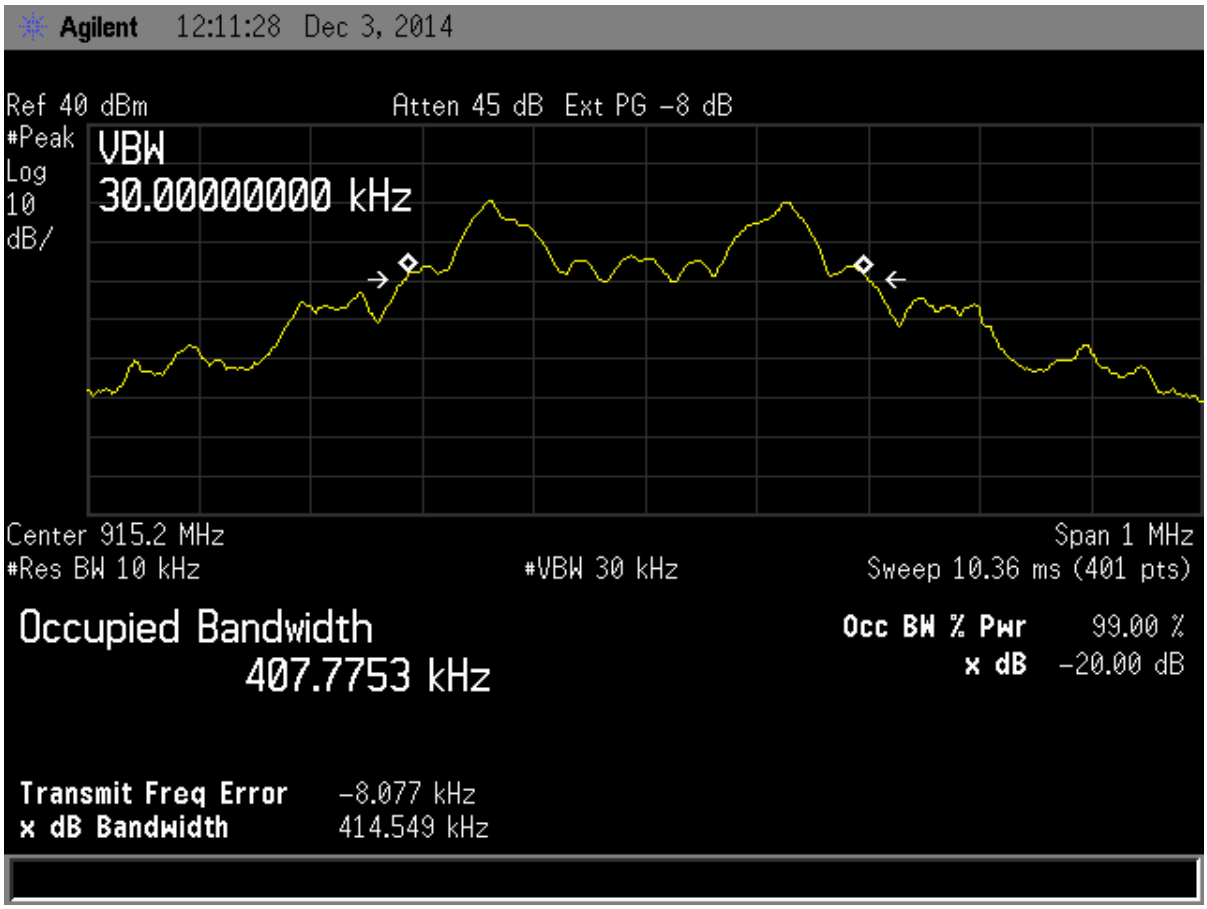


Figure 16 - Mid Channel - 20 dB and 99 % Occupied Bandwidth

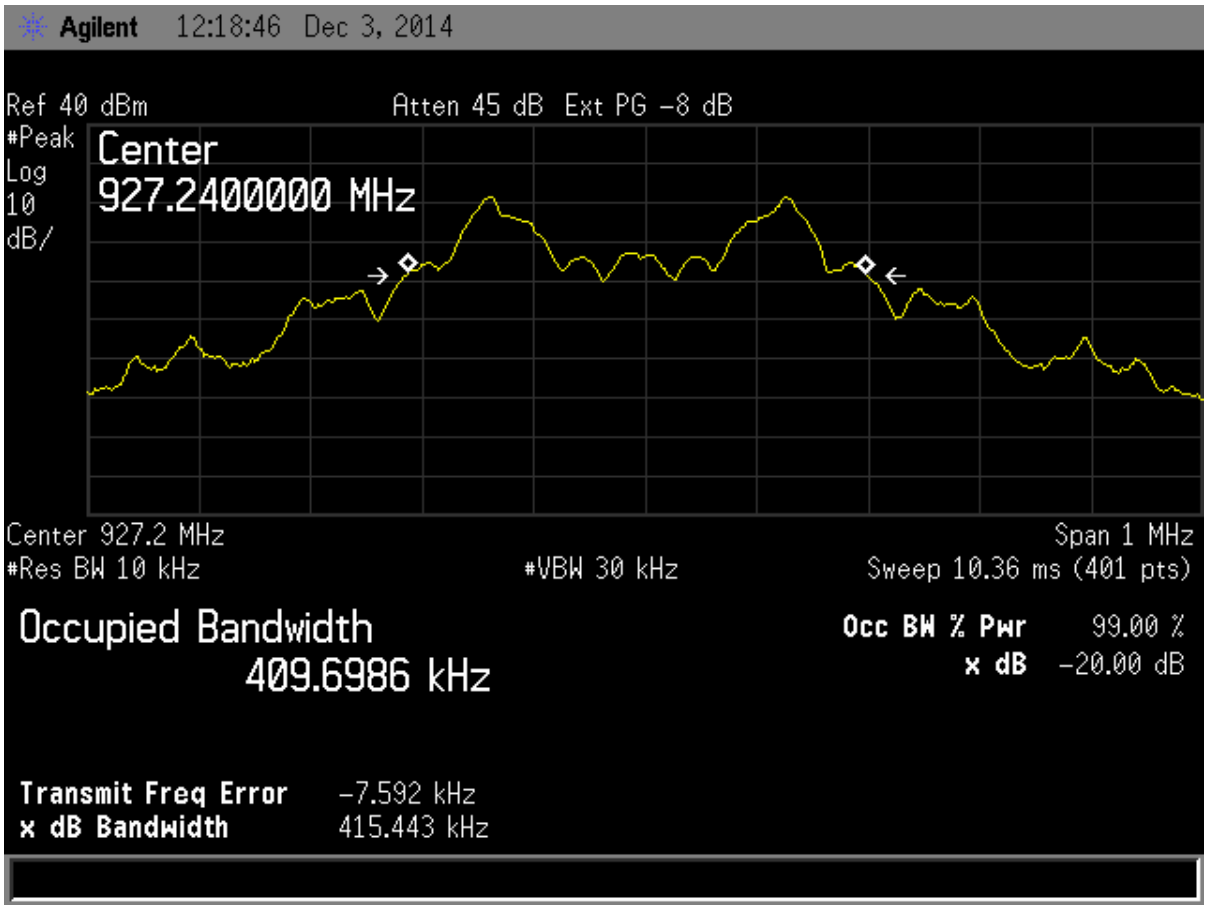


Figure 17 - High Channel - 20 dB and 99 % Occupied Bandwidth

2.11 Frequency Separation (CRF 15.247(a)(1))

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. In this case the 20 dB bandwidth separation is greater, the requirement was met.

The test procedures outlined in FCC Public Notice DA 00-705 was used to conduct measurements. The EUT hopping function was enabled during the testing.

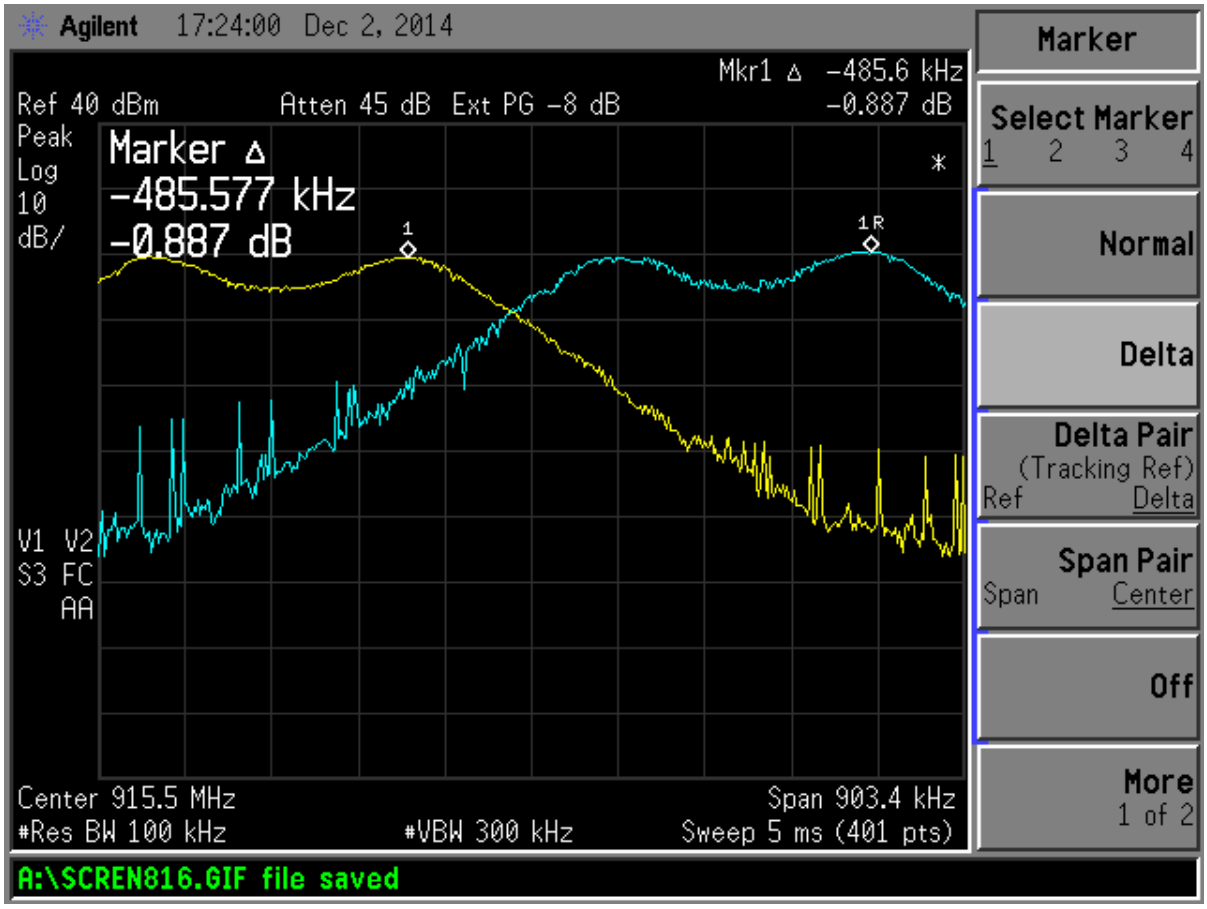


Figure 18 – Channel Separation

Measured Delta (Figure 16)	485.58	kHz
-Limit (20 dB Bandwidth)	415.44	kHz
Margin	70.14	kHz

2.12 Number of Hopping Frequencies (CFR 15.247 (a)(1)(i)) (CRF15.247(b)(1))

Frequency hopping systems in the 902-928 MHz bands shall use at least 50 hopping frequencies if the 20 dB bandwidth of the hopping channels is less than 250 kHz. If the 20 dB bandwidth of the hopping channels is 250 kHz or greater, then at least 25 hopping frequencies shall be used.

Since the EUT has a 20 dB bandwidth greater than 250 kHz, then at least 25 non-overlapping channels are used.

The test procedures outlined in FCC Public Notice DA 00-705 was used to conduct measurements.

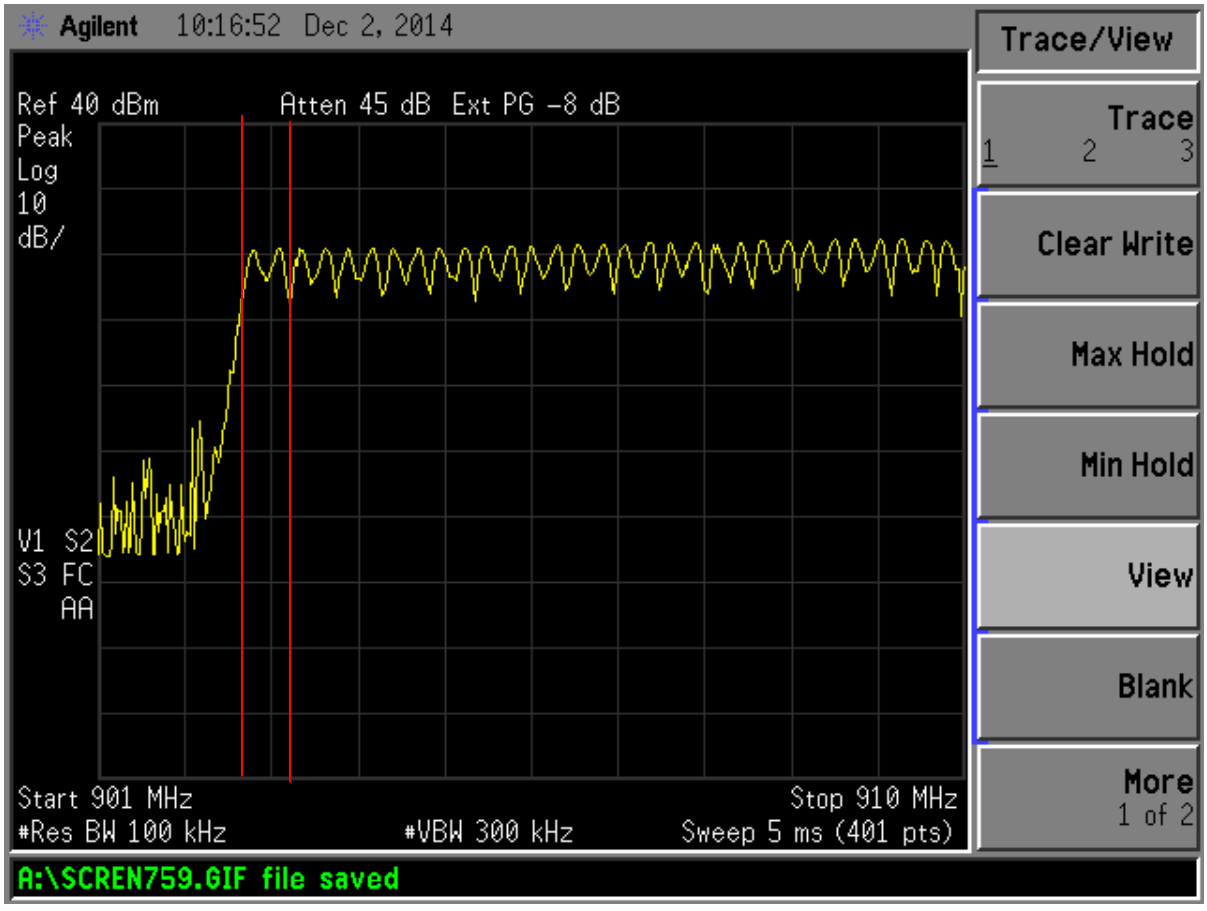


Figure 19 – Hopping Channels 0 through 15

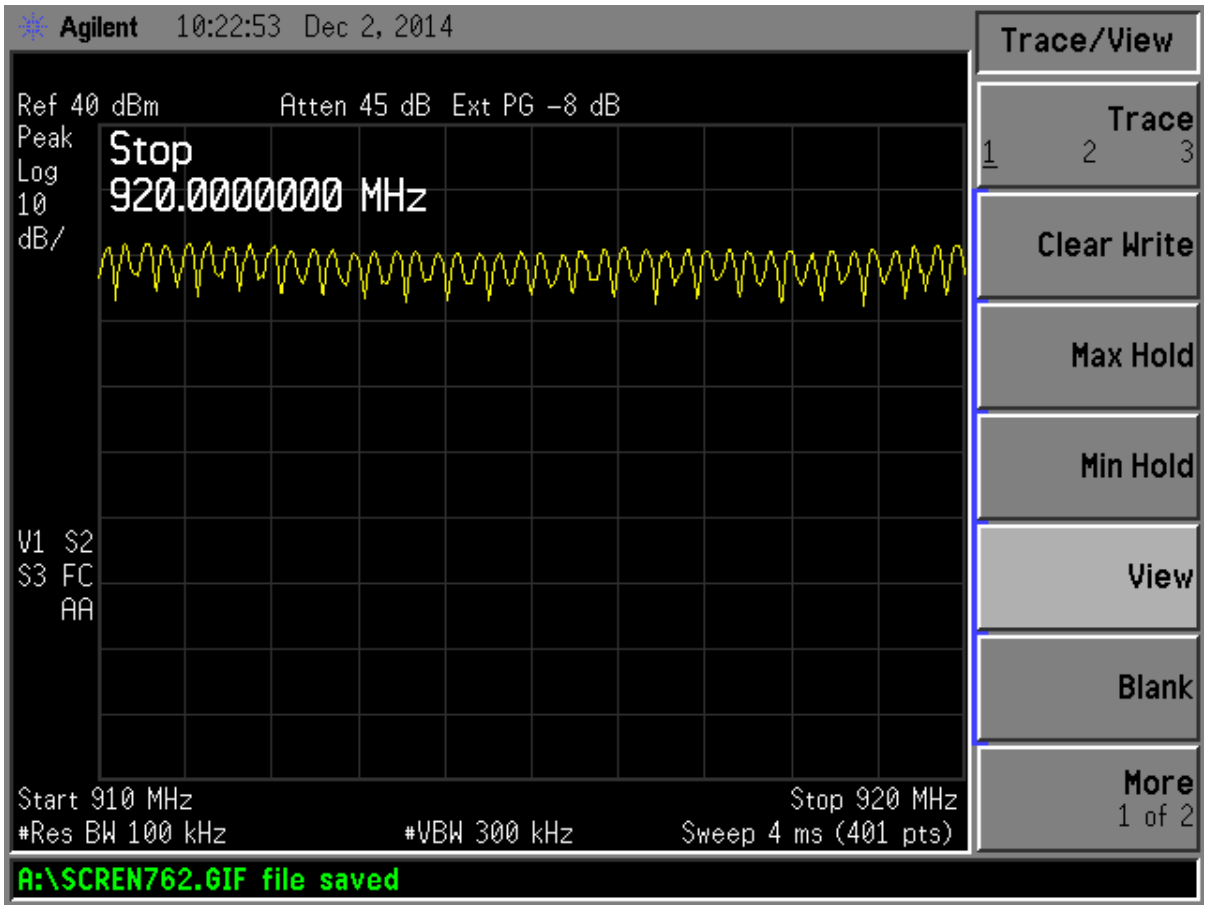


Figure 20 – Hopping Channels 16 through 35

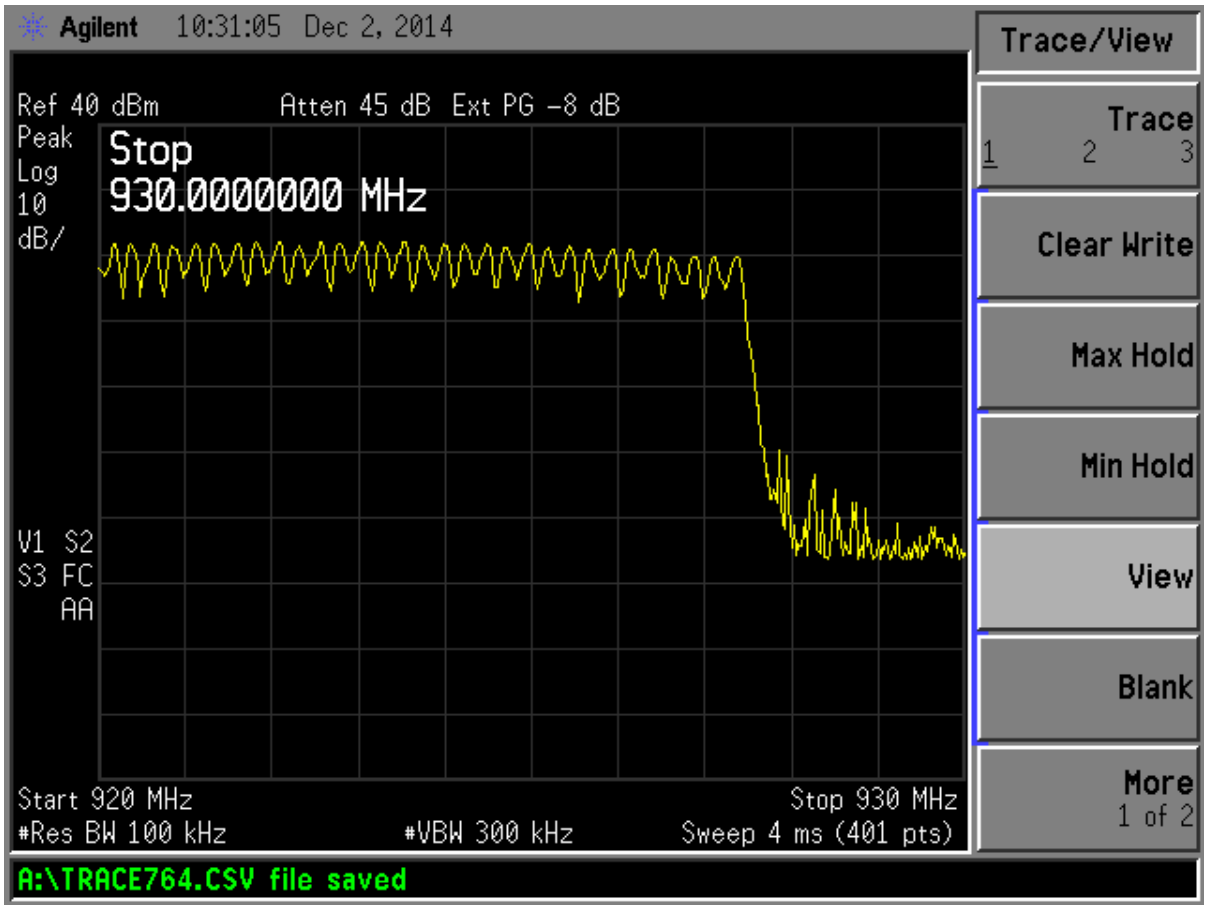


Figure 21 – Hopping Channels 36 through 52

2.13 Average Time of Occupancy (CFR 15.247 (a)(1)(i))

Frequency hopping systems in the 902-928 MHz bands with a 20 dB bandwidth less than 250 kHz shall have an average time of occupancy not greater than 0.4 seconds within a 20 second period. If the 20 dB bandwidth of the hopping channels is 250 kHz or greater, then the average time of occupancy shall not be greater than 0.4 seconds within a 10 second period.

Since the EUT has a 20 dB bandwidth greater than 250 kHz then the average time of occupancy shall not be greater than 0.4 seconds within a 10 second period.

The test procedures outlined in FCC Public Notice DA 00-705 was used to conduct measurements.

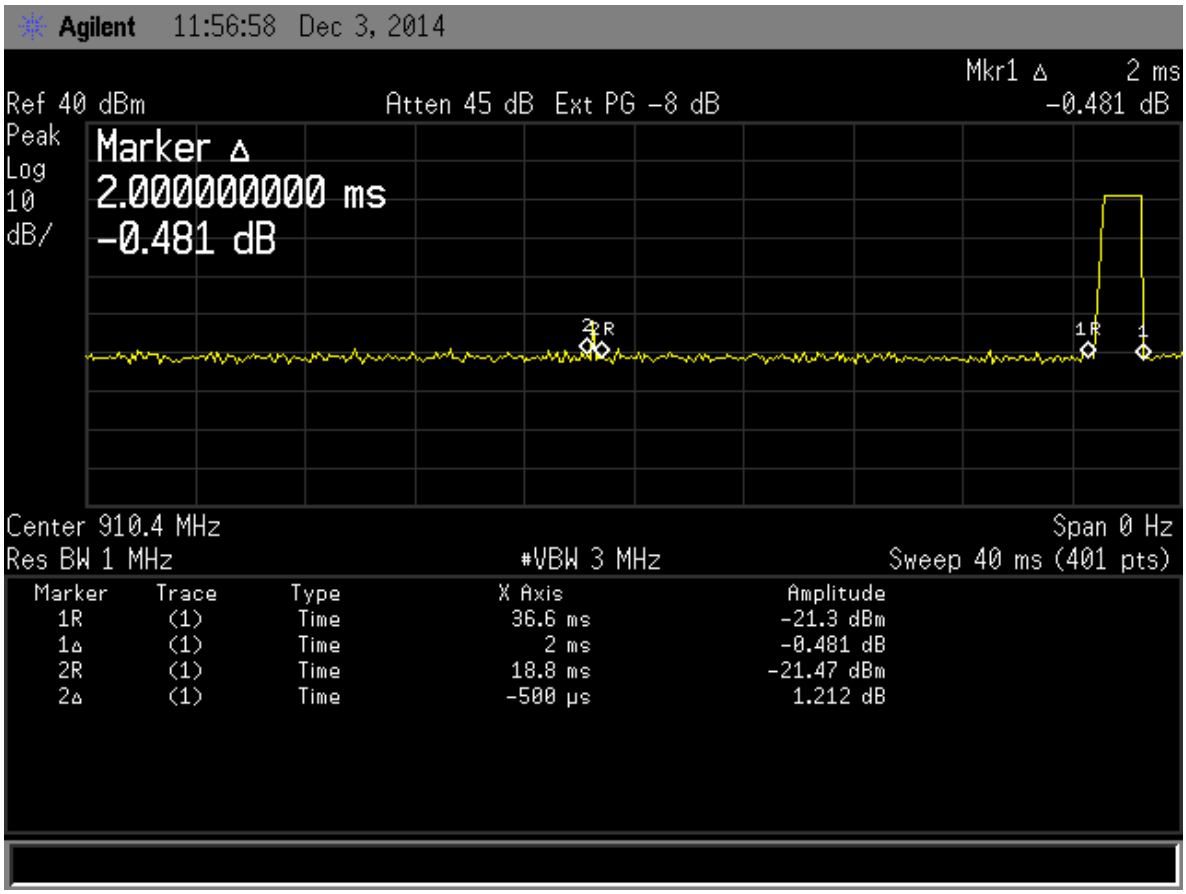


Figure 22 – Average Time of Occupancy

Limit = 0.4 s/ 10 s = 40 ms per channel

Limit	40.00	ms
-Total Time On (Figure 22)	2.50	ms
Margin	37.50	ms

2.14 Intentional Radiator Power Lines Conducted Emissions (CFR 15.207)

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in Part 15.207(a), as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The testing was carried out in accordance with CFR 15.207 and ANSI C63.4:2009, Paragraph 7, with a spectrum analyzer connected to an LISN and the EUT placed into normal use mode.

The worst-case power line conducted emission in the range of 150 kHz to 30 MHz was 8.2 dB below the limit at 2.23 MHz on the Neutral Line. This signal is found in Table 9. All other radiated emissions were 8.7 dB or more below the limit.

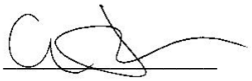
Table 9. Power Line Conducted Emissions Data, Class B Part 15.207

CONDUCTED EMISSIONS 150 kHz to 30 MHz						
Tested By: CF	Specification Requirement: FCC Part 15.207		Project No.: 14-0286	Client: RFM		
				Model: DNT90		
Frequency (MHz)	**Test Data (dBuV)**	**LISN+CL-PA (dB)**	**Corrected**	**Avg Limits (dBuV)**	**Margin (dB)**	**Detector**
120 VAC, 60 Hz, Phase Line						
0.17	52.28	1.19	53.47	64.96 *	11.5	**PK**
0.17	23.21	1.18	24.39	55.0	30.6	**QP**
0.51	34.02	0.40	34.42	46.0	11.6	**PK**
4.55	31.67	0.44	32.11	46.0	13.9	**PK**
9.40	32.66	0.56	33.22	50.0	16.8	**PK**
10.13	30.17	0.59	30.76	50.0	19.2	**PK**
26.35	21.02	0.98	22.00	50.0	28.0	**PK**
120 VAC, 60 Hz, Neutral Line						
0.20	43.91	1.02	44.93	53.7	8.7	**PK**
0.51	34.10	0.57	34.67	46.0	11.3	**PK**
2.23	36.83	0.94	37.77	46.0	8.2	**PK**
5.06	30.09	1.29	31.38	50.0	18.6	**PK**
10.00	22.88	1.53	24.41	50.0	25.6	**PK**
25.95	20.19	1.79	21.98	50.0	28.0	**PK**

* Denotes the Quasi-Peak limits being used instead of average.

SAMPLE CALCULATIONS: At 0.17 MHz:

Magnitude of Measured Frequency	52.28	dBuV
+ Cable Loss+ LISN Loss	1.19	dB
=Corrected Result	53.47	dBuV
Limit	64.96	dBuV
-Corrected Result	53.47	dBuV
Margin	11.50	dB

Test Date: December 3, 2014
By
Signature:  Name: Carrie Fincannon

2.15 Intentional Radiator, Radiated Emissions (CFR 15.209)

Radiated emissions disturbance Measurements were performed with an instrument having both peak and quasi-peak detectors over the frequency range of 150 kHz to 10 GHz, in compliance with Part 15.33 and Part 15.209. Measurements of the radiated emissions were made with the receiver antenna at a distance of 3 m from the boundary of the test unit.

The test antenna was varied from 1 m to 4 m in height while watching the analyzers' display for the maximum magnitude of the signal at the test frequency. The antenna polarization (horizontal or vertical) and test sample azimuth were varied during the measurements to find the maximum field strength readings to record.

The worst-case radiated emission in the range of 150 kHz to 10 GHz was 6.2 dB below the limit at 386 MHz. This signal is found in Table 11. All other radiated emissions were 7.8 dB or more below the limit.

Table 10 . Unintentional Radiator, Peak Radiated Emissions (CFR 15.209), 150 kHz to 30 MHz

150 kHz to 30 MHz							
Test: Radiated Emissions				**Client:** RFM			
Project: 14-0286				**Model:** DNT90			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
No Emissions were seen less than 20 dB from the limit.							

Tested from 150 kHz to 30 MHz

SAMPLE CALCULATION: N/A

Test Date: December 3, 2014
Tested By
Signature: _____ Name: Carrie Fincannon

Table 11 . Unintentional Radiator, Peak Radiated Emissions (CFR 15.109), 30 MHz to 1000 MHz

30 MHz to 1000 MHz with Class B Limits							
Test: Radiated Emissions				**Client:** RFM			
Project: 14-0286				**Model:** DNT90			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**QP Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or QP**
386.00	43.67	-7.70	35.97	46.0	3m./HORZ	10.0	**PK**
482.00	39.65	-5.05	34.60	46.0	3m./HORZ	11.4	**QP**
204.39	43.64	-13.15	30.49	43.5	3m./VERT	13.0	**QP**
386.00	47.95	-8.20	39.75	46.0	3m./VERT	6.2	**PK**
480.00	43.15	-4.95	38.20	46.0	3m./VERT	7.8	**QP**
188.64	41.54	-10.07	31.47	43.5	3m./HORZ	12.0	**PK**
43.86	44.47	-16.13	28.34	40.0	3m./VERT	11.7	**PK**
49.88	46.11	-16.41	29.70	40.0	3m./VERT	10.3	**QP**

Tested from 30 MHz to 1 GHz

SAMPLE CALCULATION at 386 MHz:

Magnitude of Measured Frequency	43.67	dBuV
+ Cable Loss +Antenna Factor -Amp Gain	-7.70	dB
=Corrected Result	35.97	dBuV
Limit	46.00	dBuV
-Corrected Result	35.97	dBuV
Margin	10.00	dB

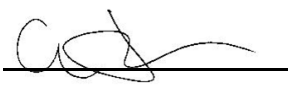
Test Date: December 2, 2014
Tested By
Signature:  Name: Carrie Fincannon

Table 12 . Unintentional Radiator, Peak Radiated Emissions (CFR 15.109), 1 GHz to 10 GHz

1 GHz to 10 GHz with Class B Limits							
Test: Radiated Emissions				**Client:** RFM			
Project: 14-0286				**Model:** DNT90			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
No Emissions were seen less than 20 dB from the limit.							

Tested from 1 GHz to 10 GHz

SAMPLE CALCULATION : N/A

Test Date: December 3, 2014
Tested By
Signature: _____ Name: Carrie Fincannon

2.15.1 Measurement Uncertainty

The measurement uncertainties given were calculated using the method detailed in CISPR 16-4. A coverage factor of k=2 was used to give a level of confidence of approximately 95%.

2.15.2 Conducted Emissions Measurement Uncertainty

Measurement Uncertainty (within a 95% confidence level) for this test is ± 2.78 dB.

The data listed in this test report does have sufficient margin to negate the effects of uncertainty. Therefore, the EUT unconditionally meets this requirement.

2.15.3 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m, the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.39 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.18 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.21dB.

The data listed in this test report does have sufficient margin to negate the effects of uncertainty. Therefore, the EUT unconditionally meets this requirement.