Test Report

MEASUREMENT		EXHIBIT
I	Transmitter Output Power	6A
II	Occupied Bandwidth	6B
III	Radiated Spurious	6C
IV	Conducted Spurious	6D
V	ERP Power	6E
VI	Frequency Behavior	6F
VII	Frequency Stability Frequency vs. Temperature	6G

EXHIBIT 6

EXHIBIT 6a: MEASURED DATA – Pursuant 47 CFR 2.1041

6.1 ISM Band Transmitter Output Power -- Pursuant 47 CFR 2.1033(b)(6) and 15.247(b)(2)

The ISM transmitter operating in the 902-928 MHz band is a frequency hopped, fixed output power type. Output power (as defined in 47 CFR 15.247) is controlled as described in Exhibit 12.

Maximum peak output power rating: 1000 milliWatts (30 dBm), peak power.

6.2 DC Power Used by Final Amplifier Device -- Pursuant 47 CFR 2.1033(c)8)

In order to prevent the malfunctions that can occur due to directly measuring the DC characteristics of the final RF amplifying stage, data was obtained by measuring the entire radio DC current and is reported herein for the entire radio.

The DC current and the RF output power was a conducted measurement using a power supply set to supply the radio with the nominal battery voltage of 4.0 V. The characteristics were measured during a transmission pulse and are listed in the Table 6-1:

	ISM				
Characteristics	**902-928 MHz**				
Power Setting	**maximum**				
DC Voltage (Volts)	4				
DC Current (A)	1.1				
Output Power (W)	1.0				

Table 6-1 Characteristics for ISM 900 MHz bands

EXHIBIT 6b: MEASURED DATA – Pursuant 47 CFR 2.1041

6.3 900 MHz ISM Band Modulation Characteristics and Necessary Bandwidth

In the 900 MHz ISM band, the subject radio makes use of Frequency Shift Keying. The modulation can vary from 2FSK, 4FSK, 6FSK or 8FSK.

The data symbols are up-sampled to a rate Ns times the symbol rate, and pulse shaped by a filter having impulse response p_n. The pulse shape filter is the cascade of a square pulse, of duration equal to one symbol interval, convolved with a Gaussian filter with 3 dB bandwidth equal to 8000 Hz or BT = 2.5. The pulse-shaped signal is integrated using a backward-summation, and then mapped to in-phase (I) and quadrature (Q) channels using the cosine and sine functions, respectively. A scaling factor of π/Ns is required to convert the integrator output to modulated phase. This modulation is shown in Figure X.

The pre-modulation filter has the continuous-time impulse response

$$p(t) = Q\left[\frac{2\pi B}{\sqrt{\ln 2}}\left(t-\frac{T}{2}\right)\right] - Q\left[\frac{2\pi B}{\sqrt{\ln 2}}\left(t+\frac{T}{2}\right)\right]$$

where t is time in seconds, T = 1/3200 is the symbol interval in seconds, B is the 8000 Hz 3-dB bandwidth, and Q(x) is the complimentary distribution function for a Gaussian random variable with zero mean and unit variance, given by

$$Q(x) = \int_x^\infty \frac{1}{\sqrt{2\pi}} e^{-x^2/2} dx$$

The discrete-time impulse response is generated by sampling the continuous-time function. In theory, p(t) has infinite time span, but, for all practical purposes, it is time-limited to the interval

$$-3T/4 < t < 3T/4$$

Given this, the discrete-time version is generated as

$$p_n = p\left(t_0 + \frac{nT}{N_s}\right) \qquad n = 0, 1, \ldots, N_p - 1$$

where t_0 is the time of the first sample, N_s is the number of samples per second, and N_p is the filter length.

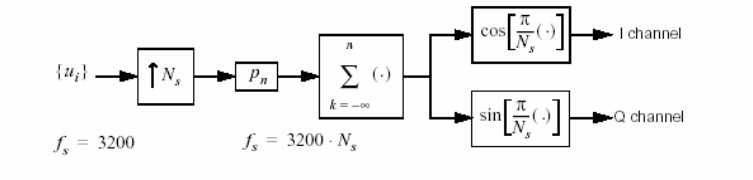


Figure 6-3. FSK Modulator

OCCCUPIED BAND WIDTH

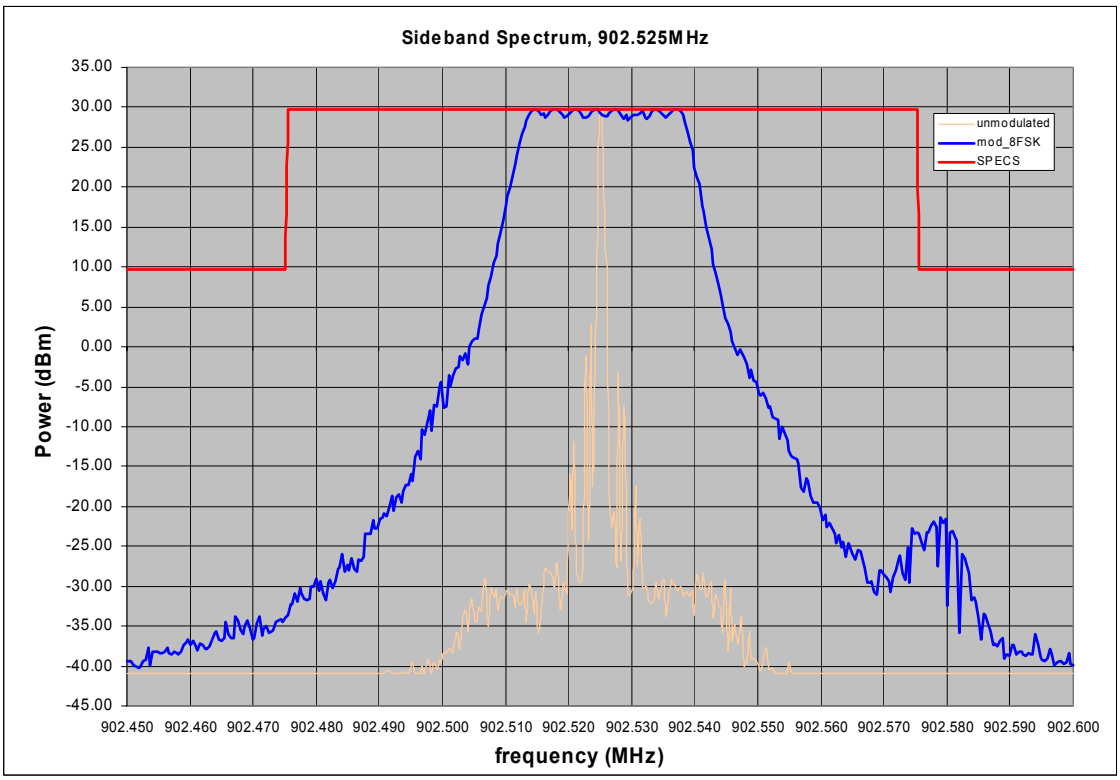


Figure 6-3A. Occupied bandwidth for 902.525MHz 8FSK Spectrum.

OCCCUPIED BAND WIDTH

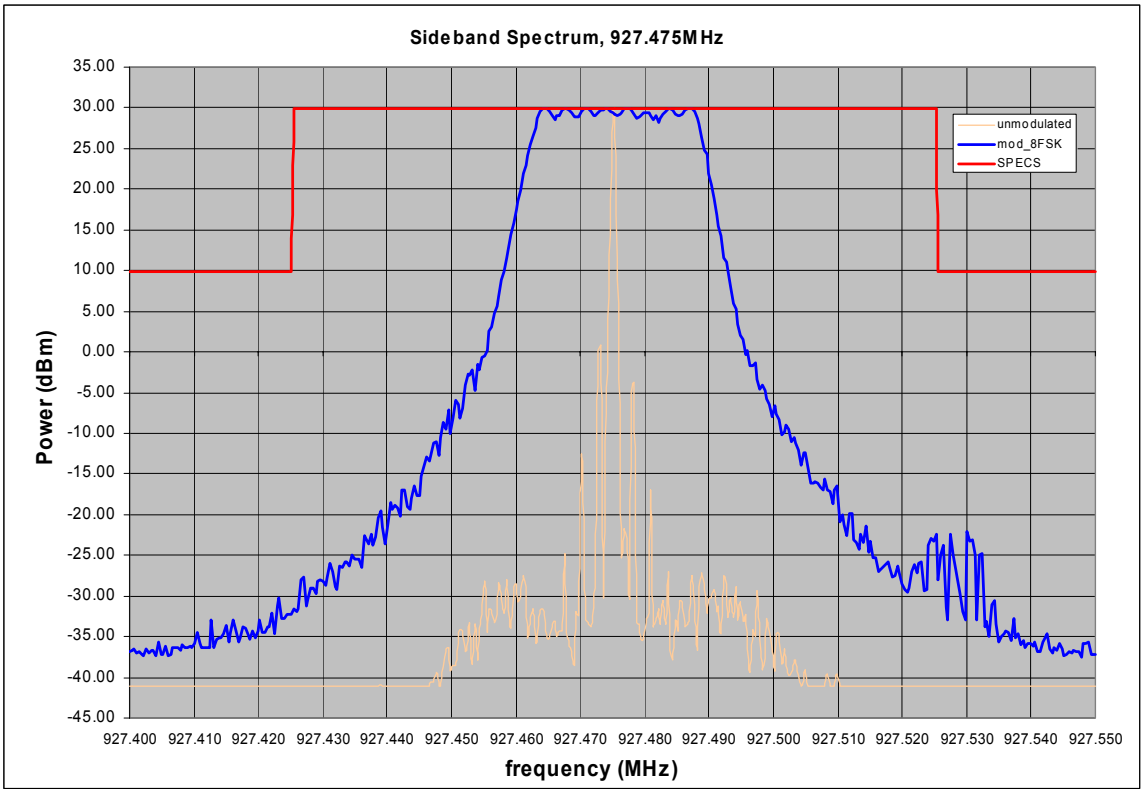


Figure 6-3B. Occupied bandwidth for 927.475MHz 8FSK Spectrum

The emission requirements specified for operation in the 902-928 MHz ISM Band include a requirement that there is no emission greater than –20 dBc detectable in a 100 KHz bandwidth at all frequencies outside the ISM band. For this measurement the transmitter is tuned to maximum output power at the lowest operating frequency. A similar measurement was made at the upper ISM band edge with the transmitter operating at the maximum ISM band operating frequency.

EXHIBIT 6c: MEASURED DATA – Pursuant 47 CFR 2.1041

6.4 Radiated Spurious Emissions -- Pursuant 47 CFR 2.1053, 2.1057, 90.210(g)(3), 90.691(a)(2), 15.247(c)

6.4.1 ISM Band Limits

Per 15.247(c) the peak allowable emission shall be less than 10 dBm when measured in a 100 kHz band outside the ISM Band.

Figure 6.4-1 Spurious Emissions 900 MHz ISM Band.

Measurement Technique – 15.247 TX Spurious Restricted Band Emissions

Frequency Hopping - Non-standardized testing

Emissions at each freq were maximized by:

Following guidelines specified in ANSI C63.4-2003 with regards to emission maximizations [rotation through three orthogonal axes, etc...

Procedure for final emissions detection:

Freq Span for each harmonic [e.g. 5th harmonic]
Start Freq = low channel freq * harmonic# [e.g. 902*5= 4.51 GHz]
Stop Freq = Hi Channel freq * harmonic# [e.g. 928*5=4.64 GHz]

Detector function = peak
Trace = max hold

1) Find an antenna height where the emissions can be discerned

2) Rotate the EUT in 15 deg increments and looking at the band of interest for over 10 sec [sweep time = 15 ms dwell time = 90 ms |10s peak hold observation assures full capture of all channels]. Execute peak search and mark down maximum emission at each azimuth. Continue until measure all azimuths 0 - 345 degrees. Note the azimuth where the emission is maximum.

3) With EUT oriented in azimuth of maximum emission determined in 2), move the antenna up through 1-4m and find maximum emissions height. Move 1-4 m several times to make sure get max [peak search] [NOTE – no three antenna height testing].

4) Open up the Res / Vid BW to 1 MHz to capture peak emission - note the value

This emission, once corrected by the Duty Cycle Correction Factor as explained in Public Notice DA-00705, must meet the limits for the peak emission found in 15.35(b) [74 dBuV/m].

If this emission meets the 15.209 Average Limit - no further action is necessary

15.247 TX Spurious Radiated Emissions Testing
Motorola DTR650 with removable antenna
1GHz-10GHZ

NON STANDARDIZED TEST- FREQ HOPPING ON

Model: Motorola DTR650
TX Power ste to default maximum factory setting 30dBM (1W)

Receive Path = 10ma [cables roted back to calibrated 10m site- cable 103w/ 3dB pad /Cable 102- patched to SA w/ Cable 15-Amp 1- Horn 271]
Filter- Trilithic 23042 x5H1612075-AA

Emission Level (dBuV/m=Max Peak Emission+ System Correction Factor
System Correction Factor = AF = Cable 103[w_3dB Pad] + Filter - PreAmp Gain + Cable 102+ [10mA+Cable15]

*****Dwell time correction = 20log(dwell time/ 100ms) = 20log(10.7ms/100ms)= 19.41dB**
20log(10.7ms/100ms)= 19.41

Res = 1MHz / Vid = 1MHz - Peak Emission

Frequency (MHz)	Max Peak Emission Level (dBuV)	Ant Pol	System Correction Factor	Peak Emission	Dwell time*** Emission Correction level (dBuV)	CFR 47 15.35 " Peak Emission" Limit (dBuV/m)	Meas "Average " Emission Level (dBuV/m)	15.209 Restricted Band "Average" Emission Limit (dBuV/m)
1831.1	42.86	HOR	1.66	44.52	25.11	92.82*		
2762.0	42.90	HOR	6.36	49.26	29.85	74.00	Peak meets Avg Limit	54.00
2777.0	44.34	VERT	6.2	50.54	31.13	74.00	Peak meets Avg Limit	54.00
3618.0	45.96	HOR	10.22	56.18	36.77	74.00	Peak meets Avg Limit	54.00
3660.0	47.21	VERT	10.16	57.37	37.96	74.00	Peak meets Avg Limit	54.00
4535.0	41.75	HOR	12.92	54.67	35.26	74.00	Peak meets Avg Limit	54.00
4602.0	46.36	VERT	13.81	60.17	40.76	74.00	Peak meets Avg Limit	54.00
5457.0	43.18	VERT	16.66	59.84	40.43	74.00	Peak meets Avg Limit	54.00
5514.0	44.38	HOR	17.43	61.81	42.40	92.82*	peak meets 20dBc limit	
6408.7	39.30	HOR	19.79	59.09	39.68	92.82*	peak meets 20dBc limit	
7240.2	40.01	HOR	23.74	62.63	43.22	74.00	Peak meets Avg Limit	54.00
7404.0	44.40	VERT	23.45	67.85	48.44	74.00	Peak meets Avg Limit	54.00
8158.0	26.70	HOR	42.56	69.26**	49.85	74.00	Peak meets Avg Limit	54.00
8158.0	20.20	VERT	42.56	62.76**	43.35	74.00	Peak meets Avg Limit	54.00
9155.3	37.27	HOR	31.38	68.65	49.24	74.00	Peak meets Avg Limit	54.00

[Note - HOR worst case verified for 9 GHz harmonic]

***Peak meets 20dBc Limit**
****Data measured at TIMCO Engineering FCC approved test site**
*****Dwell time correction = 20log(dwell time/ 100ms) = 20log(10.7ms/100ms)= 19.41dB**

Fundamental Measurement for 20dBc limit

Res = 1MHz Vid = 1MHz Peak

Frequency (MHz)	Max Emission Level (dBuV)	Ant Pol	Underground Cable	Horn 271 Ant.Factor (3m)	Antenna Cable to Amp (Cable#103)	Access Cable Loss (#102)	Emission (dBuV/m)
915.525	77.67	Hor	5.90	22.9	4.57	1.78	112.82
915.525	92.21	Vert	5.90	22.9	4.57	1.78	127.36

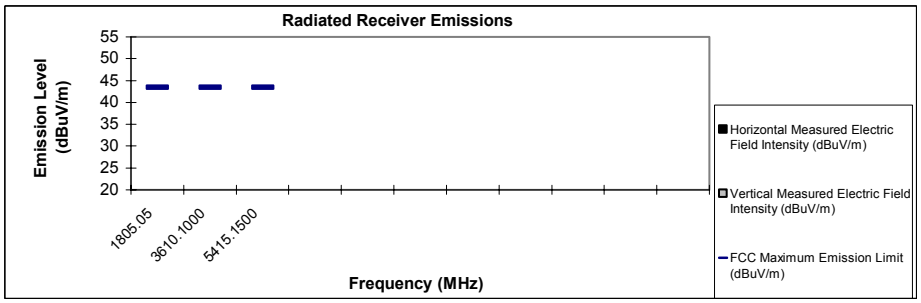
Figure 6-4A

Motorola Inc. **FCC ID:AZ489FT5852**

Receiver Radiated Spurious Emissions : DTR Removable Antenna

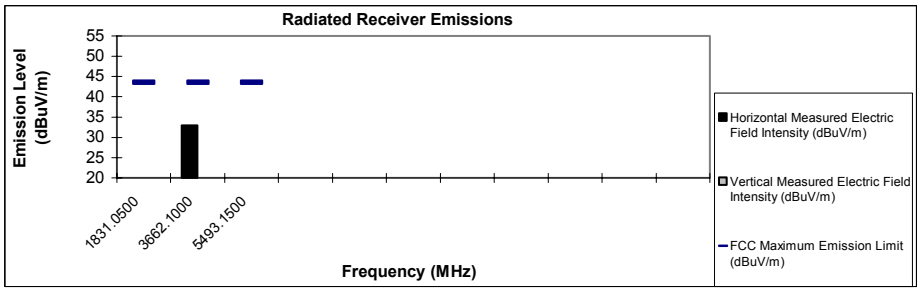
902.525 MHz **Channel Spacing 50KHz | S/N 21**

Frequency (MHz)	FCC Maximum Emission Limit (dBuV/m)	Horizontal Measured Electric Field Intensity (dBuV/m)	Vertical Measured Electric Field Intensity (dBuV/m)
1805.05	43.5	*	*
3610.1000	43.5	*	*
5415.1500	43.5	*	*



915.525 MHz **Channel Spacing 50KHz | S/N 21**

Frequency (MHz)	FCC Maximum Emission Limit (dBuV/m)	Horizontal Measured Electric Field Intensity (dBuV/m)	Vertical Measured Electric Field Intensity (dBuV/m)
1831.0500	43.5	*	*
3662.1000	43.5	32.91	*
5493.1500	43.5	*	*



* Indicates the spurious emission could not be detected due to noise limitations or ambients.

Motorola Plantation EMC Lab – Test Performed by: Curt Mc Lennan **October 14, 2005**
FCC Registration: 91932 / Industry Canada: IC3679

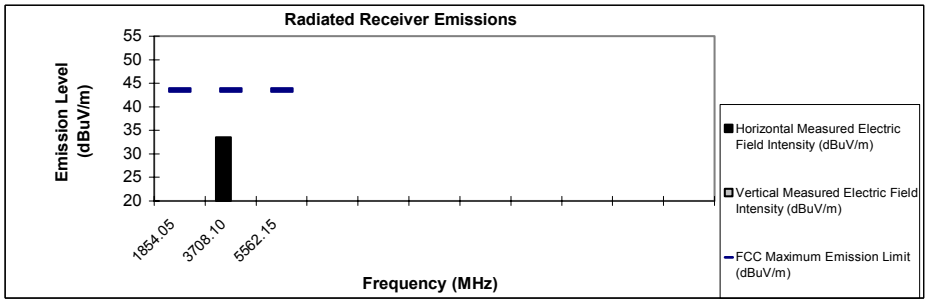
Figure 6-4B

Motorola Inc. **FCC ID:AZ489FT5852**

Receiver Radiated Spurious Emissions : DTR Removable Antenna

927.025 MHz **Channel Spacing 50KHz | S/N 21**

Frequency (MHz)	FCC Maximum Emission Limit (dBuV/m)	Horizontal Measured Electric Field Intensity (dBuV/m)	Vertical Measured Electric Field Intensity (dBuV/m)
1854.05	43.5	*	*
3708.10	43.5	33.55	*
5562.15	43.5	*	*



* Indicates the spurious emission could not be detected due to noise limitations or ambients.

Motorola Plantation EMC Lab – Test Performed by: Curt Mc Lennan **October 14, 2005**
FCC Registration: 91932 / Industry Canada: IC3679

Figure 6-4C

EXHIBIT 6D: Conducted Harmonic Spurious Emission

11-Oct-05

DTR Removable Antenna p1

FCC ID: AZ489FT5852

Conducted Harmonic spurs

HP 8566P Spectrum analyzer settings
VBW 100
KHz
RBW 100
KHz

Max Hold, Sweep Auto

Mini Circuits High Pass filter Model VHF-1500

No pads or cables used (connectors only)

Harmonic	Freq L (MHz)	Fcenter (MHz)	Freq H (MHz)	Peak Freq (GHz)	Measured Peak RF level (dBm)	Filter Loss (dB)	Peak RF level (dBm)	Peak RF level (dBc)	Limit dBc
1	902.525	915.000	927.475						
2	1805.050	1830.000	1854.950	1.806	-58.9	1	-57.90	-87.90	-20
3	2707.575	2745.000	2782.425	2.764	-57.4	0.7	-56.70	-86.70	-20
4	3610.100	3660.000	3709.900	3.639	-55.1	0.95	-54.15	-84.15	-20
5	4512.625	4575.000	4637.375	4.528	-66.3	1.3	-65.00	-95.00	-20
6	5415.150	5490.000	5564.850	5.466	-70.3	1.75	-68.55	-98.55	-20
7	6317.675	6405.000	6492.325	6.317	-60.1	3.8	-56.30	-86.30	-20
8	7220.200	7320.000	7419.800	7.417	-45.2	3.9	-41.30	-71.30	-20
9	8122.725	8235.000	8347.275	8.133	-47.9	4.2	-43.70	-73.70	-20
10	9025.250	9150.000	9274.750	9.272	-40.2	4.9	-35.30	-65.30	-20

EXHIBIT 6E: ERP MEASURED DATA – Pursuant 47 CFR 2.1041

ERP DTR Removable Antenna

	Frequency	Turn Table Deg.	Path Loss	Radiated Spur Emiss. (dBm)
Horiz.	902.525	0	39.03	11.46
Horiz.	902.525	45	39.03	10.37
Horiz.	902.525	90	39.03	4.54
Horiz.	902.525	135	39.03	8.45
Horiz.	902.525	180	39.03	9.01
Horiz.	902.525	225	39.03	8.46
Horiz.	902.525	270	39.03	8.10
Horiz.	902.525	315	39.03	7.04
Vert.	902.525	0	40.54	29.35
Vert.	902.525	45	40.54	27.83
Vert.	902.525	90	40.54	27.27
Vert.	902.525	135	40.54	28.00
Vert.	902.525	180	40.54	29.06
Vert.	902.525	225	40.54	28.33
Vert.	902.525	270	40.54	28.04
Vert.	902.525	315	40.54	28.40

ERP DTR Removable Antenna

	Frequency	Turn Table Deg.	Path Loss	Radiated Spur Emiss. (dBm)
Horiz.	915.525	0	39.06	10.86
Horiz.	915.525	45	39.06	15.21
Horiz.	915.525	90	39.06	15.48
Horiz.	915.525	135	39.06	11.72
Horiz.	915.525	180	39.06	7.30
Horiz.	915.525	225	39.06	10.41
Horiz.	915.525	270	39.06	15.05
Horiz.	915.525	315	39.06	12.50
Vert.	915.525	0	40.68	29.09
Vert.	915.525	45	40.68	26.99
Vert.	915.525	90	40.68	26.85
Vert.	915.525	135	40.68	27.53
Vert.	915.525	180	40.68	28.31
Vert.	915.525	225	40.68	28.31
Vert.	915.525	270	40.68	28.07
Vert.	915.525	315	40.68	27.97

ERP DTR Removable Antenna

	Frequency	Turn Table Deg.	Path Loss	Radiated Spur Emiss. (dBm)
Horiz.	927.025	0	39.54	11.20
Horiz.	927.025	45	39.54	13.49
Horiz.	927.025	90	39.54	10.57
Horiz.	927.025	135	39.54	11.17
Horiz.	927.025	180	39.54	12.97
Horiz.	927.025	225	39.54	8.16
Horiz.	927.025	270	39.54	6.44
Horiz.	927.025	315	39.54	9.38
Vert.	927.025	0	40.94	28.89
Vert.	927.025	45	40.94	27.27
Vert.	927.025	90	40.94	26.87
Vert.	927.025	135	40.94	27.25
Vert.	927.025	180	40.94	28.69
Vert.	927.025	225	40.94	27.88
Vert.	927.025	270	40.94	27.78
Vert.	927.025	315	40.94	27.82

EXHIBIT 6f: MEASURED DATA – Pursuant 47 CFR 2.1041

6.11: 900 ISM Band Carrier Separation between Hopsets – Pursuant 47 CRF, Part 15.247(a) (1)

The separation between frequencies is measured to be 500 kHz as shown in Figure 6-41.

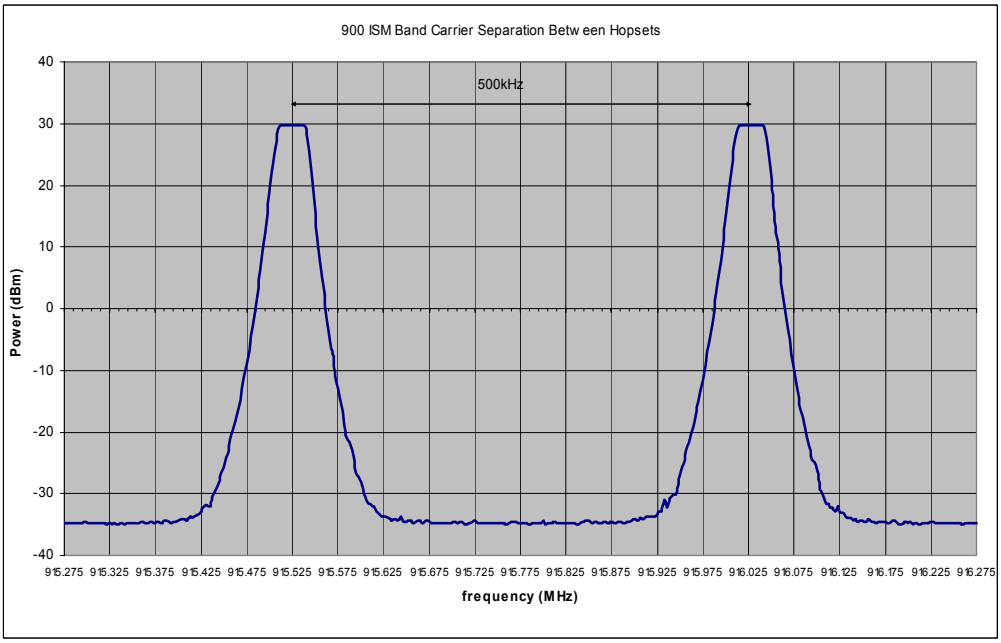


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Figure 6-41. Plot of 900 MHz ISM Band adjacent channel separation within a hopset.

6.12 900 ISM Band Hopping Bandwidth between Hopsets –Pursuant 47 CRF, Part 15.247 (a) (1)(i)

Figure 6-42 shows the plot of the 8-FSK, traffic channel ISM Band spectrum with its 20 dB bandwidth of 25.65 kHz. .

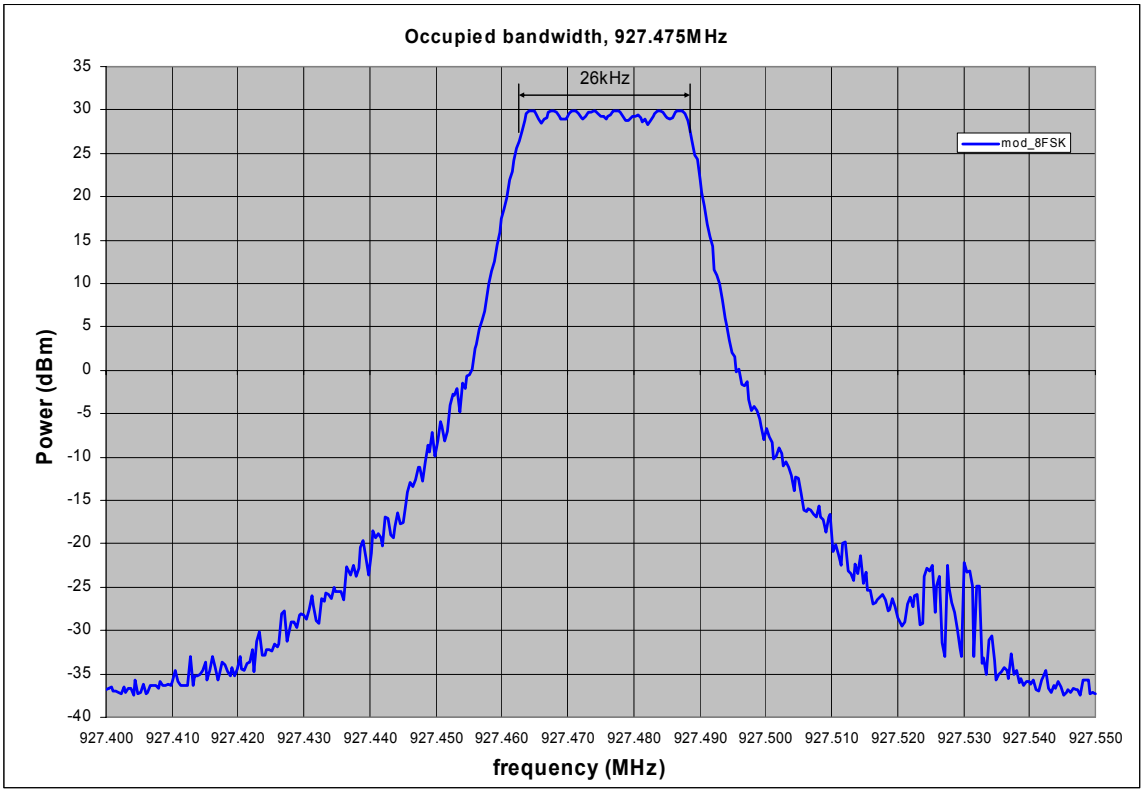
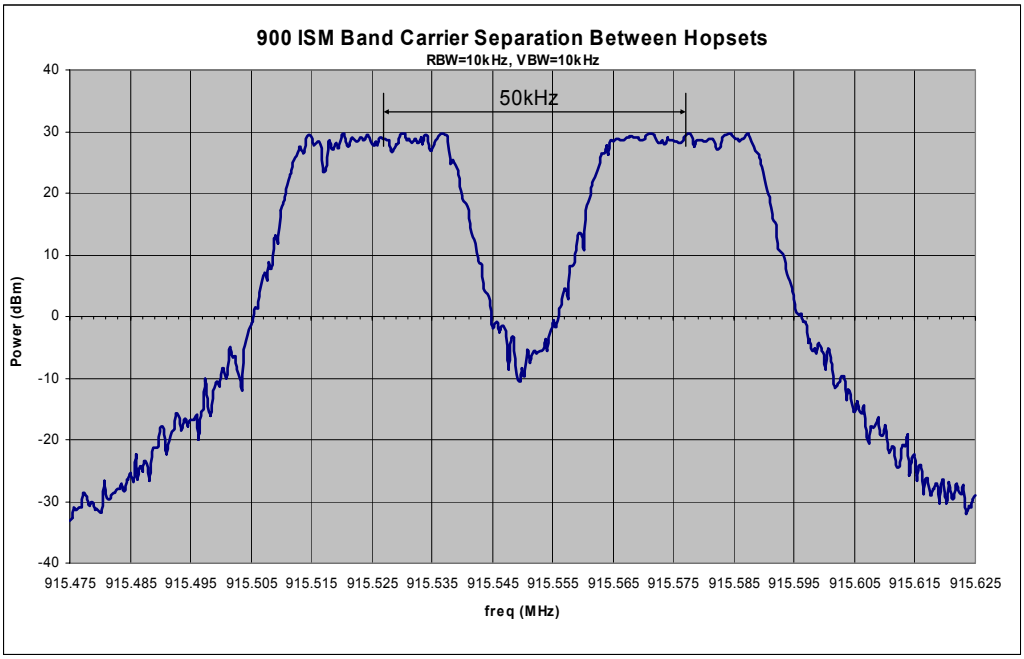


Figure 6-42. Spectrum analyzer plot of 900 MHz ISM Band 8-FSK traffic channel signal's 99% Bandwidth

The adjacent hopset channel separation was measured between hopset @ 915.525 MHz and hopset @ 916.025 MHz which is 50 kHz.

Figure 6-43: Adjacent hop-set separation.



6.13 900 ISM Band Receiver Bandwidth – Pursuant 47 CRF, Part 15.247(a)(1)

The receiver bandwidth is limited by a 2-pole analog filter and digital processing that includes a 5th order sinc filter, IIR high-pass programmable bandwidth filter, and a 15th order programmable selectivity filter. The composite 3dB bandwidth is 28 kHz.

6.14 900 ISM Band Number of Hopping Frequencies – Pursuant 47 CRF, 15.247(a)(1)(i)

The 900 MHz ISM Band transmitter uses 50 frequencies within each selected hopset.

Hopset	1st Frequency (MHz)	Progression (MHz)	Last (50th) Frequency (MHz)
1	902.525	903.025, 903.525, 904.025...	927.025
2	902.575	903.075, 903.575, 904.075...	927.075
3	902.625	903.125, 903.625, 904.125...	927.125
4	902.675	903.175, 903.675, 904.175...	927.175
5	902.725	903.225, 903.725, 904.225...	927.225
6	902.775	903.275, 903.775, 904.275...	927.275
7	902.825	903.325, 903.825, 904.325...	927.325
8	902.875	903.375, 903.875, 904.375...	927.375
9	902.925	903.425, 903.925, 904.425...	927.425
10	902.975	903.475, 903.975, 904.475...	927.475

Table 6-6. 900 MHz Band Transmitter Frequency Hopsets.

6.15 900 ISM Band Average Time of Occupancy – Pursuant 47 CFR, Part 15.247(a)(1)(i)

Worst case scenario (continuous transmission) is as follows:
85.625 ms bursts at 90 ms intervals (hop intervals)
20 seconds per window / 0.09 seconds per hop = 222.22 hops per window
222.22 hops / 50 carriers = 4.444 bursts per carrier window
4.444 bursts * 0.08569183 seconds per burst = 0.381 seconds (less than the 0.4 second requirement)

The calculations show the average time of occupancy of 0.4 seconds or less.

Verification of burst is shown in Figure 6-44 below.

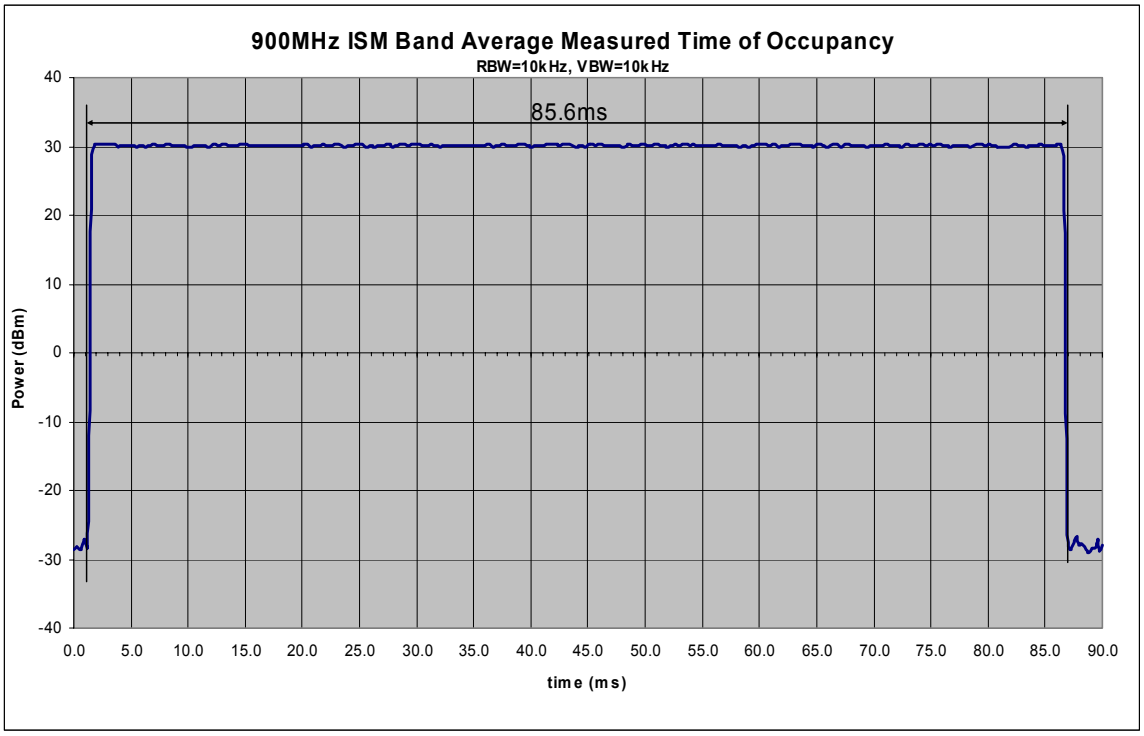


Figure 6-44. 900 MHz ISM Band Average Measured Time of Occupancy.

6.16 900 ISM Band Equal Distribution of Hopping Frequencies for Continuous Transmission – Pursuant 47 CFR, Part 15.247(a)(1)(i) & 15.247(g)

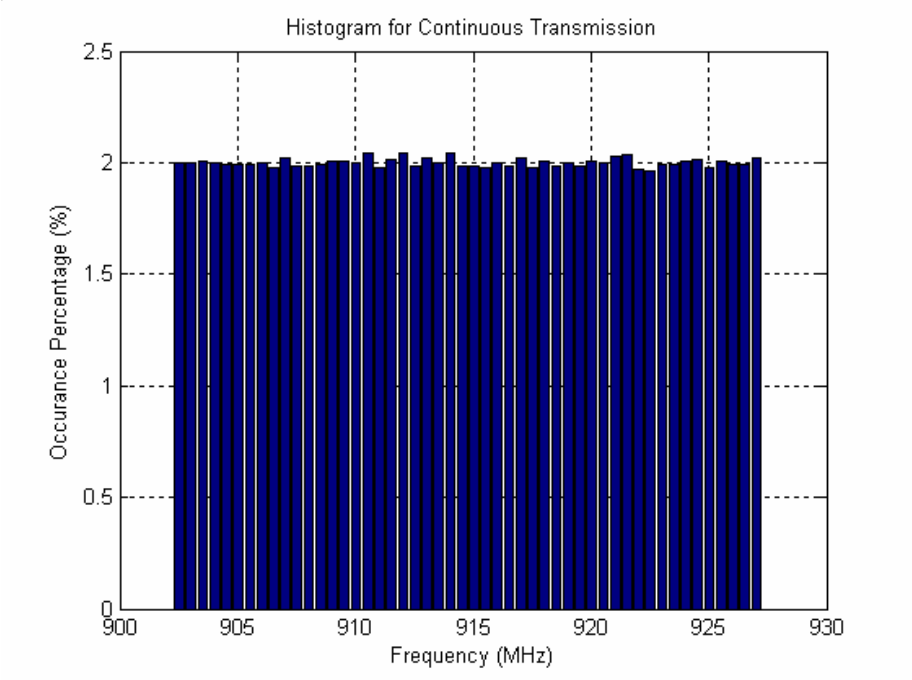


Figure 6-45. Histogram for 900 MHz ISM Band Continuous Transmission

6.17 900 ISM Band Equal Distribution of Hopping Frequencies for Discontinuous Transmission - Pursuant 47 CFR, Part 15.247(a)(1)(i) & 15.247(g)

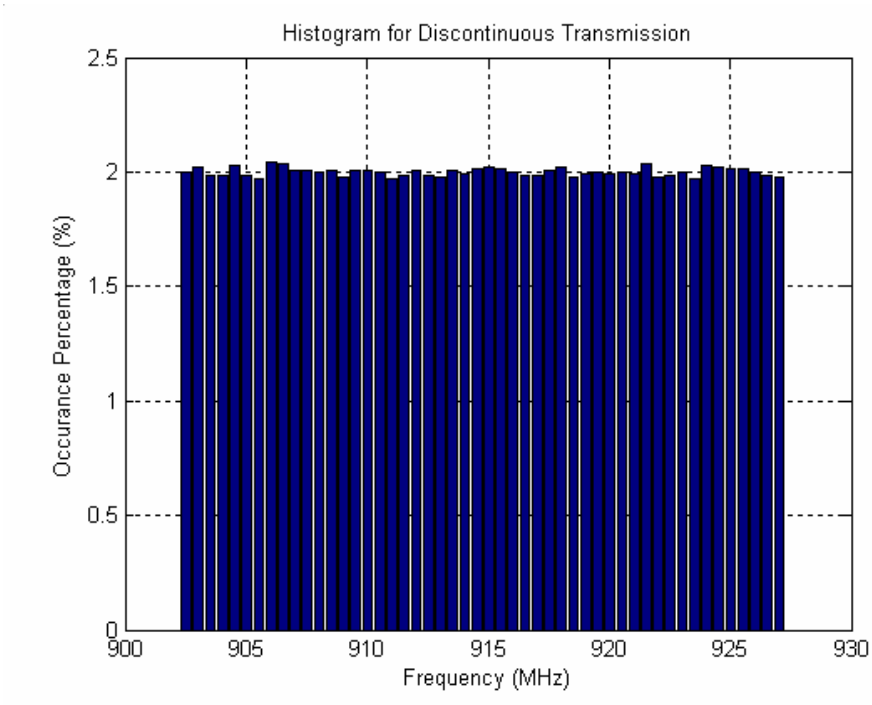


Figure 6-46. Histogram for 900 MHz ISM Band Discontinuous Transmission

6.5 EXHIBIT 6G: Frequency Stability in the 900 MHz ISM Band -- Pursuant 47 CFR 2.1055a(1) & 2.1055(d)2

The transmitter output frequency stability in the ISM band depends upon the inherent frequency stability of the Temperature Compensated Crystal Oscillator (TCXO) used as the frequency reference in the frequency generation scheme described in section 4.2.1 of this application. The total variation of the reference TCXO frequency, including changes caused by ambient temperature, supply voltage variation, and aging of the crystal is specified to be less than 2.25 PPM. This TCXO performance results in a total variation of frequency in the 900 MHz ISM band of less than 2100 Hz from nominal frequency. The radio resets at 3.3V.

No pattern in response to the change in voltage could be identified. There were tens of hertz of noise (uncertainty) in the displayed frequency at all times. This frequency noise appears to have masked the effects of changing the supply voltage.

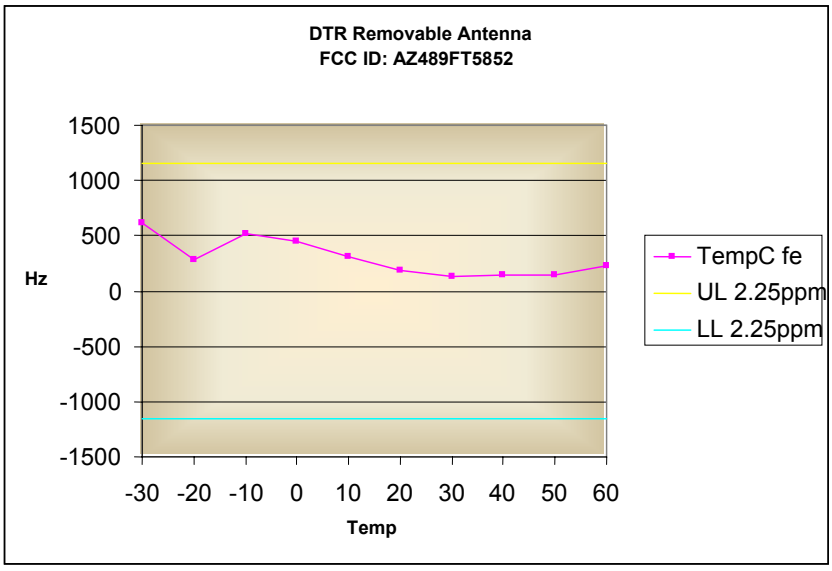


Figure 6-5: Transmitter Frequency Stability (900 MHz ISM band)- Frequency Error vs. Temperature.