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FCC PT 15.247 & PT 95H COMPOSITE DEVICE

Pt 15.247 DSSS TEST REPORT

APPLICANT	Cleveland Medical Device, Inc.
ADDRESS	4415 Euclid Ave 4th Floor Cleveland, Ohio 44103 USA
FCC ID	N9Y0086
MODEL NUMBER	DSSS Transceiver Board
PRODUCT DESCRIPTION	15.247 DSSS and Part 95 WMTS transceiver
DATE SAMPLE RECEIVED	September 20, 2006
DATE TESTED	September 20, 2006
TESTED BY	Mario R. de Aranzeta
APPROVED BY	Frank DeNuzzo
TIMCO REPORT NO.	2681BUT6TestReport_DSSS.pdf
TEST RESULTS	☒ PASS ☐ FAIL

ACCREDITED
Certificate # 0955-01

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LETTER OF EXPLANATION

9/20/2006

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Subject: Cleveland Medical Devices, Inc

FCC ID: N9Y0086 / Product Description: 15.247 DSSS and 95H WMTS module

To Whom It May Concern:

The attached application is for both a 902-928 MHz DSSS operating under 15.247 and a WMTS device operating under Part 95. The assembly consists of the base unit and an antenna.

This system has only one type of antenna per service. The antenna is vertical dipole type that has a gain of 2.14dBi. The radio may not operate both services at the same time.

CLEVELAND MEDICAL DEVICES, INC purchases standard antennas from the manufacturer. The N9Y0086 radio uses a unique connector (Hirose U.FL).

Cleveland Medical Devices, Inc. currently proposes two products for the module one being a patient worn device with no interface to a CPU (USB) or powerline. The other has provisions for both. This device's radiated and conducted emissions were tested under the DoC procedure. The powerline conducted emissions are included in this report to show that the module complies with 15.207.

Should you have any questions or require any further information with regards to this, please feel free to contact me.

Sincerely,
Mario de Aranzeta C.E.T.

MRD/sh
Encl.

STATEMENT OF COMPLIANCE

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards.

I attest that the necessary measurements were made by me or under my supervision, at Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

Certificate #0955-01

Authorized by: Mario de Aranzeta

Signature: On file

Function: Engineer

Date: October 5, 2006

REPORT SUMMARY

Purpose of Test:	To demonstrate the DUT is compliant with FCC Pt 15.247 requirements for a 902-928 MHz DSSS & 608 – 614 MHz WMTS radio module.
Disclaimer:	The test results relate only to the items tested.
Applicable Standards:	Pt 15.247, Pt 95.1101, ANSI C63.4: 2003, FCC Rules
Related Reports:	1) 2681BUT6TestReport_WMTS.pdf per Pt 95H for WMTS; 2) 2681AUT6TestReport.pdf per Pt 15.109 for Digital interface portion

TEST ENVIRONMENT AND TEST SETUP

Test Facilities:	All measurements were made at one or more of the test sites of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.
Laboratory Test Conditions:	Temperature: 26°C, Humidity: 55%
Test Exercise:	The DUT was set in continuous transmit mode of operation.
Deviation to the Standards:	There was no deviation from the standard.
Modification to the DUT:	No modification was made.
Supporting Accessories:	None

DUT DESCRIPTION

Manufacturer:	Cleveland Medical Devices, Inc.
Product Description	A Pt 15.247 DSSS and Pt 95H WMTS transceiver
FCC ID:	N9Y0086
Model Number:	100-0086
Brand Name:	N/A
Operating Frequency:	902 – 928 MHz, 608 - 614 MHz
Max. Output Pwr:	1 mWatt
Type of Modulation:	DSSS, WMTS
EUT Power Source:	Primary Power – Any 3V or greater source
	Secondary Power – N/A
Test Item:	Prototype
Type of Equipment	Mobile
Antennas	Vertical dipole type that has a gain of 2.14dBi
Antenna Connector	Hirose U.FL

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Antenna: Biconnical	Eaton	94455-1	1096		Out for Cal
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 12/29/04	12/29/06
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/04	8/27/06
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/14/05	12/14/07

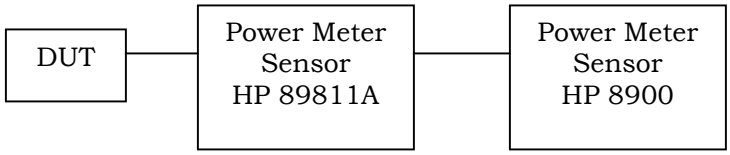
TEST PROCEDURES

Power Line Conducted Interference: The procedure used was ANSI Standard C63.4-2003. The measurement used a 50uH LISN. The spectrum was scanned from 0.15 to 30 MHz.

Bandwidth 6dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW)=1.0MHz and the video bandwidth (VBW) >=RBW and the span set as shown on plot.

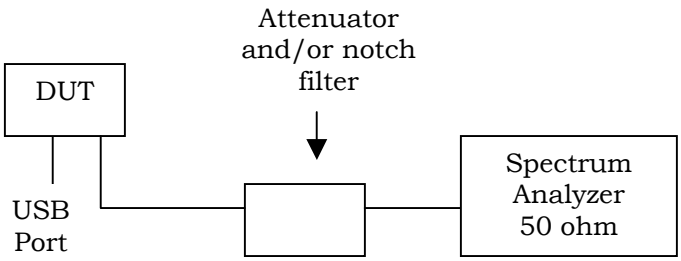
RF Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Output Power Test Setup Diagram



Antenna Conducted Spurious Emissions: The RBW=100 kHz, VBW>= RBW and the span set to 10.0MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = >RBW and the span to 50MHz.

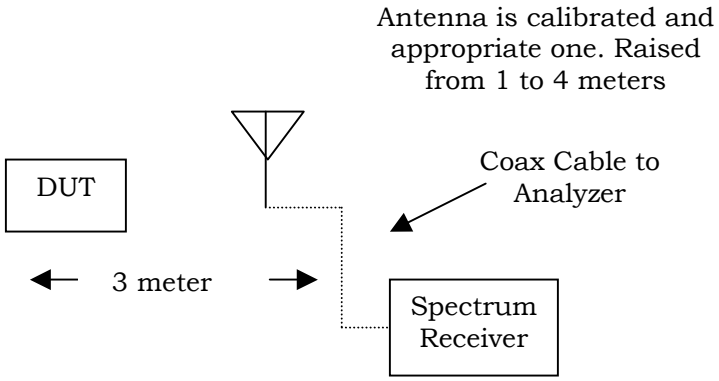
RF Conducted Spurious Emissions Test Setup Diagram



Radiation Interference: The test procedure used was ANSI standard C63.4-2003 using a Agilent spectrum analyzer with a preselector. The bandwidth (RBW) of the spectrum analyzer was 100 kHz up to 1GHz and 1.0MHz above 1GHz with an appropriate sweep speed. The VBW was always greater than or equal to the RBW unless notes. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

Radiated Spurious Emissions Into Adjacent Restricted Band: An inband plot of the fundamental emission at the lowest and highest frequencies was made using the RBW and detector function required by C63.4-2003 and FCC Rules.

Radiated Spurious Emissions: The procedure used was ANSI standard C63.4-2003 & the FCC/OET Guidance on Measurements for Direct Sequence Spread Spectrum Systems – Public Notice 54797 Dated July 12, 1995.



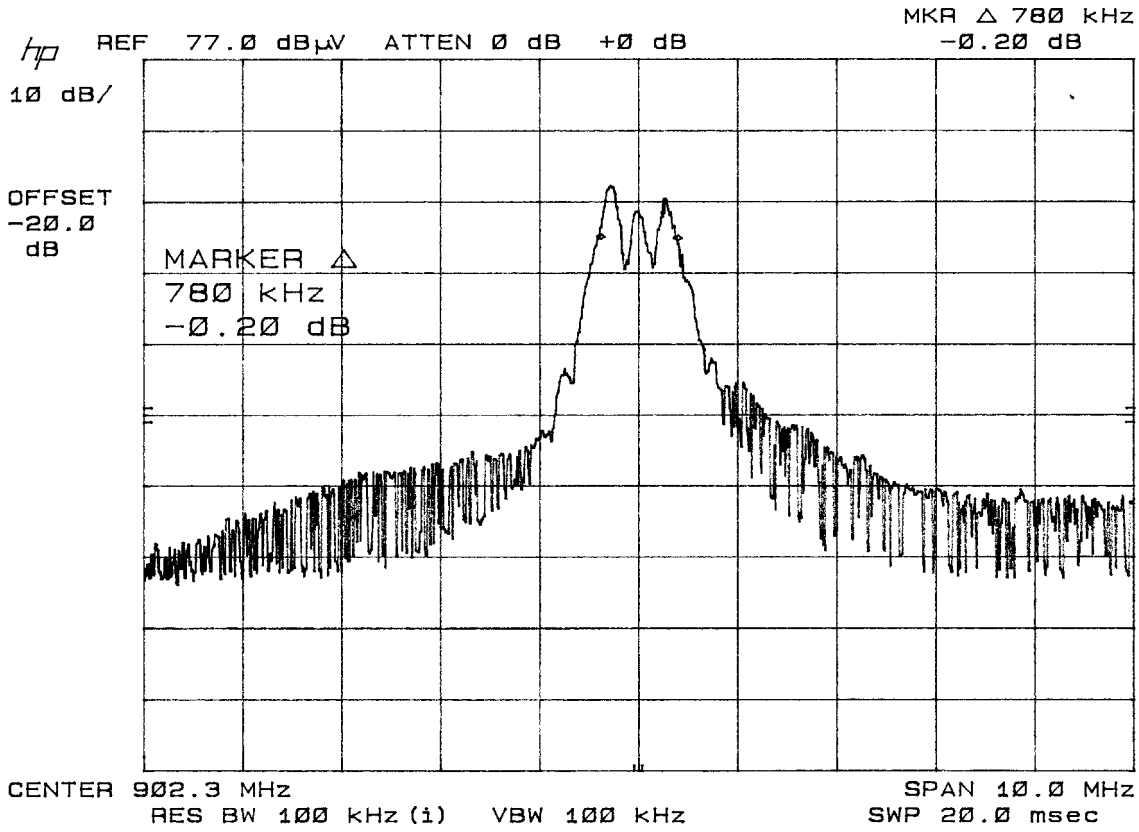
DUT is placed 80 cm above groundplane on a rotatable platform

6 dB BANDWIDTH

Rules Part No.: 15.247(a)(2)

Requirements: The 6.0dB bandwidth must be greater than 500 kHz.

Test Data:



RF POWER OUTPUT

Rules Part No.: 15.247(b)

Requirements: 1.0Watt or +30dBm conducted

Test Data:

Channel	Frequency MHz	Power output mW	dBm
1	902.56	0.45	-3.5
44	915.45	0.6	-2.2
83	927.16	1.0	0

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Rules Part No.: Pt 15.247 (c), Pt 2.1051

Requirements: Emissions must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

Test Data:

ch 1 MHz	Emissions dBm
902.5	-3.5
1804	NF
2708	-58
3609	NF
4515	-50
5417	-47.1
/	/
/	/
/	/

ch 44 MHz	Emissions dBm
915.45	-2.2
1830	NF
2745	-70
3660	NF
4576	-50
5492	-51
6408	NF
/	/
/	/

Ch83 MHz	Emissions dBm
927.5	0
1855	NF
2782	NF
3709	NF
4636	-49
5563	-62
6490	NF
7418	NF
8347	-62

Note: The spectrum was scanned to the tenth harmonic.
NF = nothing found

FIELD STRENGTH OF SPURIOUS EMISSIONS:

Rules Part No.: 15.247(c), 15.205 &15.209(b)

Requirements:

§15.247(c)& §15.205	
(Fundamental) Frequency	(Field Strength) Limits
902 – 928MHz	127.37dBuV/m
2.4 – 2.4835GHz	127.37dBuV/m
Restricted Bands	54 dBuV/m @3m
§15.209	
30 - 88 MHz	40 dBuV/m @3M
88 -216 MHz	43.5 dBuV/m @3M
216 -960 MHz	46 dBuV/m @3M
ABOVE 960 MHz	54dBuV/m

Emissions that fall in the restricted bands (15.205) must be less than or equal to 500 uV/m (54 dBuV/m). Spurious not in a restricted band must be 20 dBc.

Test Data:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
902.3	902.30	60.7	H	1.95	23.32	85.97	41.4
902.3	902.30	66.3	V	1.95	22.68	90.93	36.44
902.3	2,706.90R	18.4	V	3.39	32.85	54.64P	19.36
902.3	2706.90R	11.4	V	3.39	32.85	47.64A	6.36
902.3	2,706.90R	19.3	H	3.39	32.85	55.54P	36.24
902.3	2706.90R	12.3	H	3.39	32.85	48.54A	5.46
902.3	3,609.20R	8.8	V	4.15	33.39	46.34	7.66
902.3	3,609.20R	9.2	H	4.15	33.39	46.74	7.26
902.3	4,511.50R	10.8	H	4.76	34.11	49.67	4.33
902.3	4,511.50R	11.8	V	4.76	34.11	50.67	3.33
902.3	5,413.80R	8.5	H	5.12	35.00	48.62	5.38
902.3	5,413.80R	9.8	V	5.12	35.00	49.92	4.08

[Continued]

[Continued]

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
913.6	913.60	61.8	H	1.97	23.36	87.13	40.24
913.6	913.60	69.9	V	1.97	22.60	94.47	32.9
913.6	2,741.00R	15.9	V	3.42	32.89	52.21	1.79
913.6	2,741.00R	18.8	H	3.42	32.89	55.11P	18.89
913.6	2741.00R	12.0	H	3.42	32.89	48.31A	5.69
913.6	3,654.70R	6.8	V	4.19	33.42	44.41	9.59
913.6	3,654.70R	7.4	H	4.19	33.42	45.01	8.99
913.6	4,568.40R	11.5	V	4.78	34.15	50.43	3.57
913.6	4,568.40R	11.8	H	4.78	34.15	50.73	3.63
913.6	5,482.10	7.0	H	5.14	35.08	47.22	27.25
913.6	5,482.10	7.2	V	5.14	35.08	47.42	27.05
927.7	927.70	59.2	H	1.99	23.45	84.64	42.73
927.7	927.70	69.3	V	1.99	22.68	93.97	33.4
927.7	2,783.30R	16.5	H	3.45	32.94	52.89	1.11
927.7	2,783.30R	17.2	V	3.45	32.94	53.59	0.41
927.7	4,638.80R	10.8	H	4.82	34.21	49.83	4.17
927.7	4,638.80R	11.8	V	4.82	34.21	50.83	3.17

All readings are peak unless marked otherwise by an 'A'.
*Harmonics were checked through the 10th harmonic.

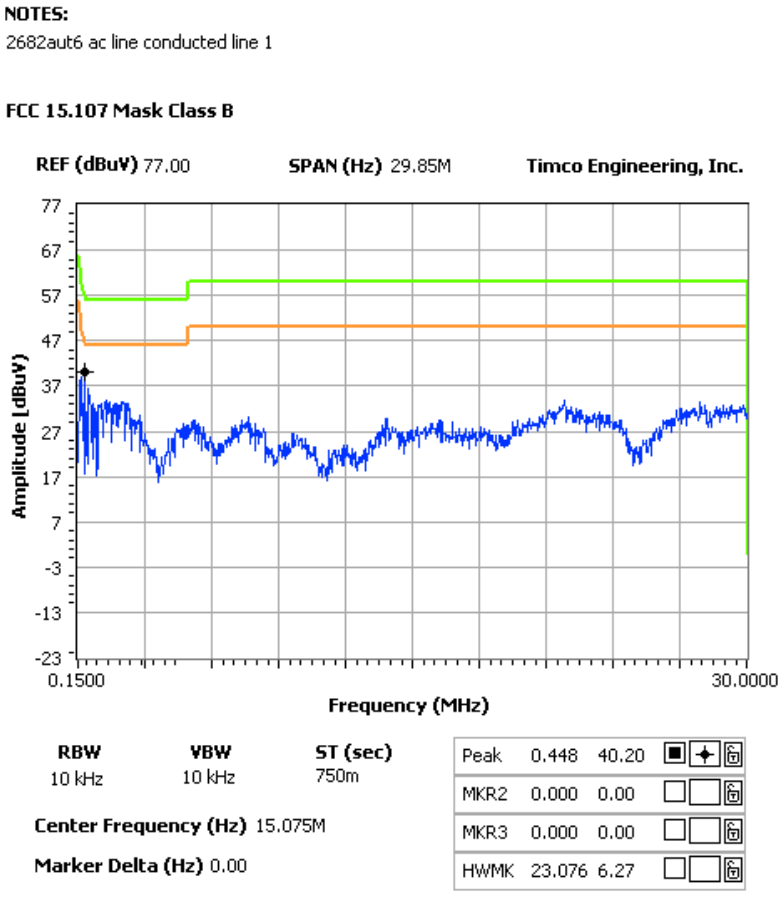
POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.207

Requirements:

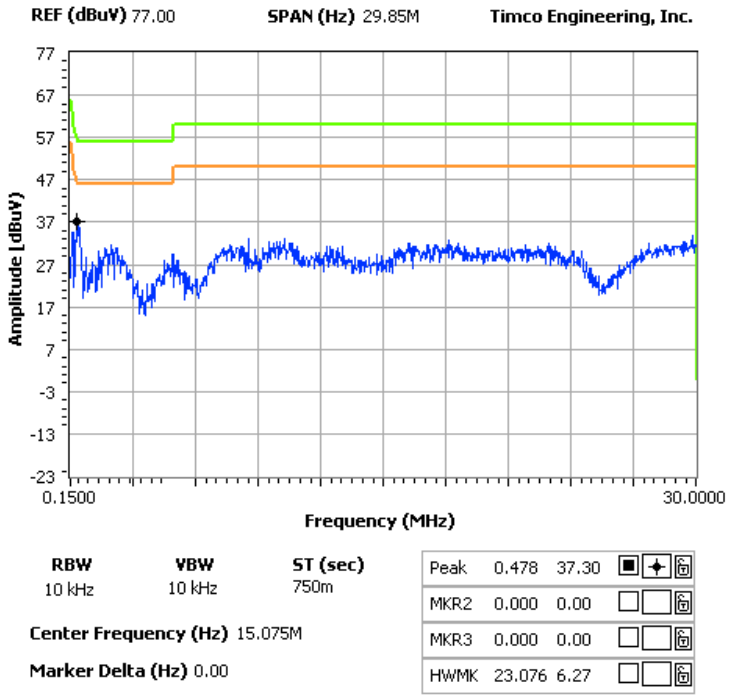
Emission Frequency (MHz)	Conducted Limit (dBµV)	
	Quasi-peak (QP)	Average (AV)
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
* Decreases with the logarithm of the frequency.		

Test Data: The plots below are for the module installed in a USB powered fixed/mobile device. Both lines were observed.



NOTES:
2682aut6 ac line conducted line 2

FCC 15.107 Mask Class B

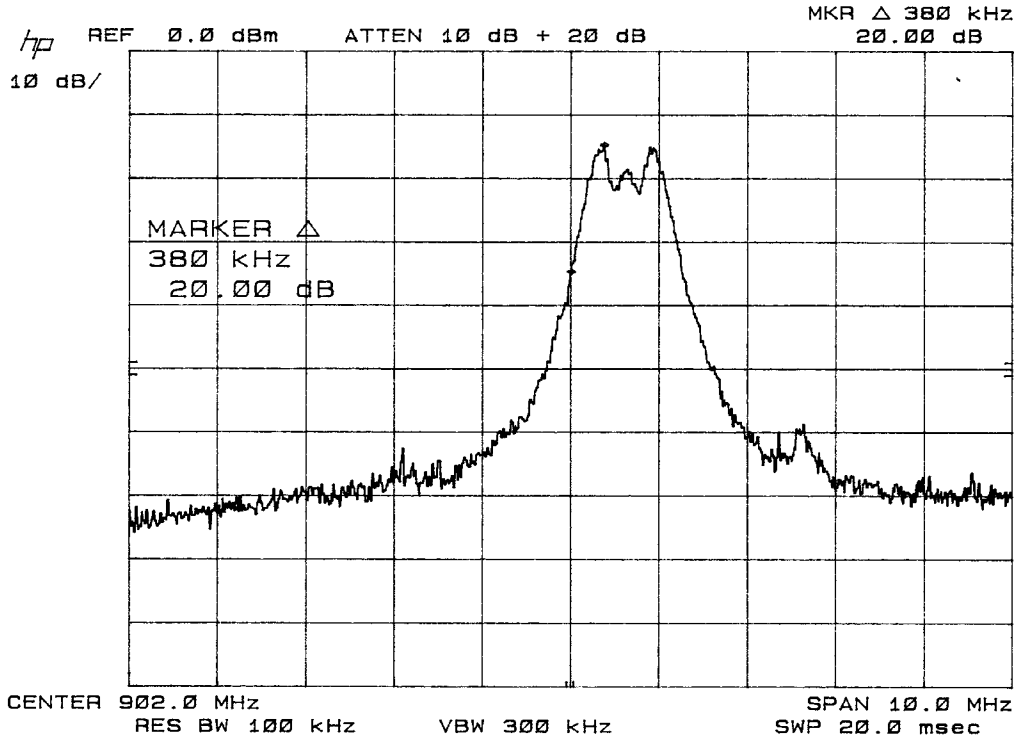


RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

Rules Part No.: Pt 15.205

Requirements: Emissions that fall in the restricted bands (15.205) must be less than or equal to 500 uV/m (54dBuV/m). Emissions not in the restricted band must be 20 dBc.

Test Data: The plots are presented below.



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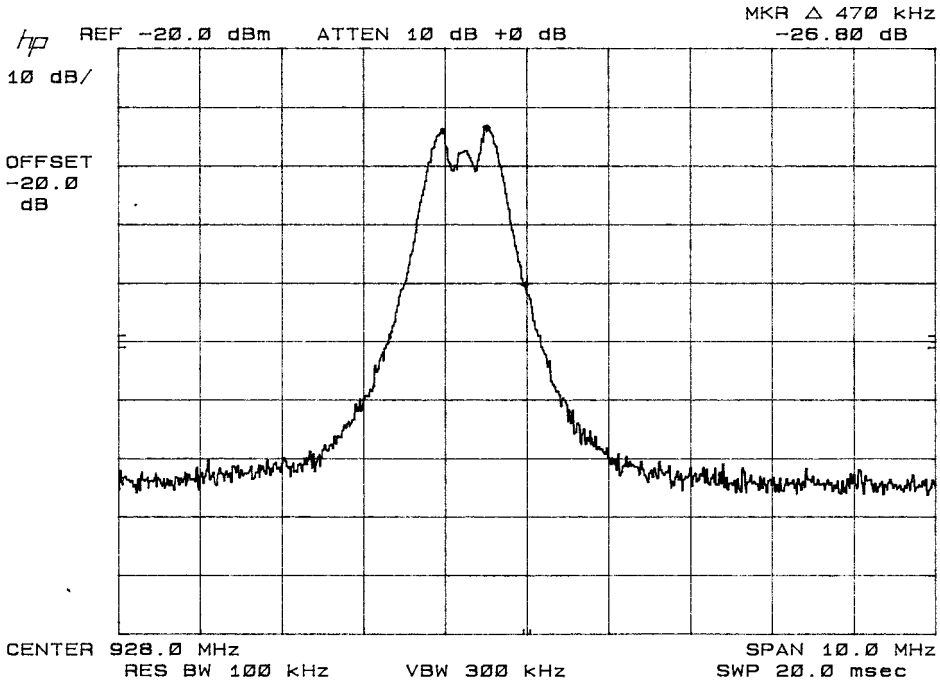

MKR Δ 470 kHz
REF -20.0 dBm
ATTEN 10 dB +0 dB
-26.80 dB
10 dB/
OFFSET
-20.0
dB
CENTER 928.0 MHz
SPAN 10.0 MHz
RES BW 100 kHz
VBW 300 kHz
SWP 20.0 msec

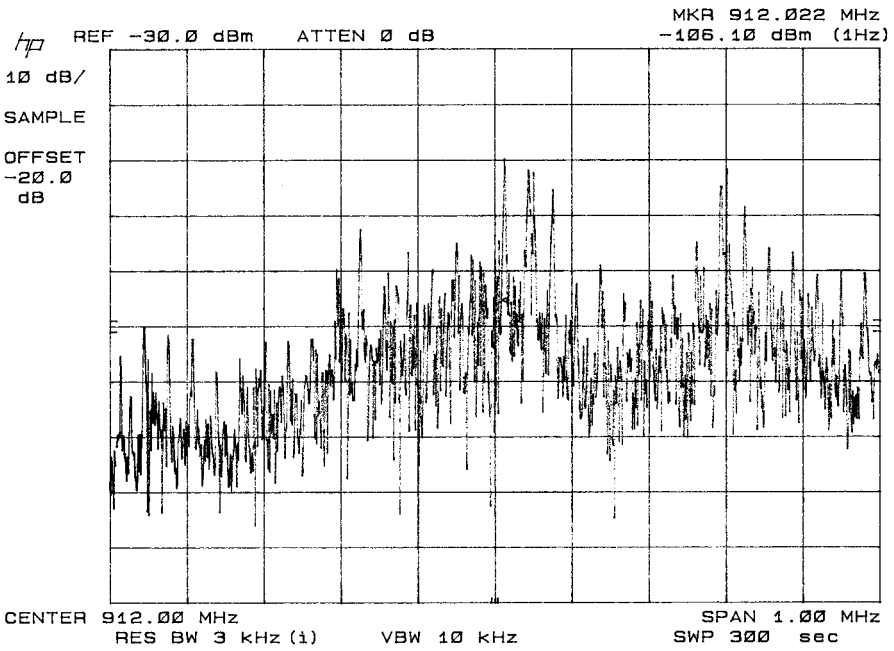
POWER SPECTRAL DENSITY

Rules Part No.: 15.247(d)

Requirements: The peak level measured must be no greater than +8.0dBm.

Test Data: The level at 912.02 MHz was –106.10 dBm.

-106.10	dBm
+25.33	ACF+CL
-80.77	dBm Field strength
-71.17 dBm	FS to conducted via Fris equation
+35 dB	Correction Factor (3 kHz to 1 Hz)
-36.17dBm	



Three places in the band were measured and the worst case presented.