

Test Report

Product Name: Measurement of RF Interference from a Model 10100S00, 0.5W UHF Transmitter

FCC ID: VMH-10100S00

MODEL NO. : 10100S00

Applicant:

Innovation Specialties 11869 Teale Street, Culver City, California, USA

Date Received: 06/25/2009

Date Tested: 06/23-24/2009

APPLICANT: Innovation Specialties FCC ID: VMH-10100S00



TABLE OF CONTENTS

APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

TEST REPORT CONTAINING:

PAGE	1TEST EQUIPMENT LIST
PAGE	2test procedure
PAGE	3-5POWER LINE CONDUCTED INTERFERENCE AND PLOTS
PAGE	6-9RADIATION INTERFERENCE TEST DATA
PANG	10-1320dB BANDWITH TEST
PANG	14NUMBER OF HOPPING FREQUENCY TEST
PANG	15-17TIME OF OCCUPANCY OF A HOPPING CHANNEL TEST
PANG	18-21CARRIER FREQUENCY SEPARATION TEST
PANG	22MAXIMUM PEAK OUTPUT POWER
PANG	23-24BAND EDGE COMPLIANCE
PANG	25ANTENNA REQUIREMENT

EXHIBIT INCLUDED:

PAGE	1BLOCK DIAGRAM
PAGE	2SCHEMATIC
PAGE	3USERS MANUAL
PAGE	4LABEL SAMPLE
PAGE	5LABEL LOCATION
PAGE	6EXTERNAL PHOTOGRAPHS
PAGE	7INTERNAL PHOTOGRAPHS
PAGE	8OPERATIONAL DESCRIPTION
PAGE	9TEST SET UP PHOTOGRAPHS



EMC Equipment List

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.
					Interval
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	100492	Mar 10,2009	1 Year
LISN	ROHDE&SCHWARZ	ENV216	100093	Mar 10,2009	1Year
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101202	Mar 10,2009	1 Year
Spectrum Analyzer	ANRITSU	MS2651B	6200238316	Mar 10,2009	1 Year
50 Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10,2009	1 Year
Bilog Antenna	Sunol	JB3	A121206	Mar 10,2009	1 Year
Horn Antenna	EMCO	3115	640201028-0 6	Mar 10,2009	1 Year
50 Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10,2009	1 Year
Cable	Resenberger	N/A	NO.1	Mar 10,2009	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Mar 10,2009	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Mar 10,2009	1 Year
Single Phase Power	Kikusui	LIN40MA-PC	LM002352	Mar 10,2009	1Year
Line Filter		R-L			
AC Power Source	Kikusui	AC40MA	LM003232	Mar 10,2009	1Year
Test analyzer	Kikusui	KHA1000	LM003720	Mar 10,2009	1Year
ESD Tester	Kikusui	KES4021	LM003537	Mar 10,2009	1 Year
Signal Generator	IFR	2032	203002/100	Mar 10,2009	1 Year
Amplifier	A&R	150W1000	301584	NCR	NCR
Dual Directional	A&R	DC6080	301508	Mar 10,2009	1 Year
Coupler					
Power Head	A&R	PH2000	301193	Mar 10,2009	1 Year
Power Meter	A&R	PM2002	302799	Mar 10,2009	1 Year
Field Monitor	A&R	FM5004	300329	Mar 10,2009	1 Year
Field Probe	A&R	FP5000	300221	Mar 10,2009	1 Year
EMCPRO System	EM Test	UCS-500-M4	V064810202 6	Mar 10,2009	1 Year
EMCPRO System	EM Test	UCS-500-M4	V064810202 6	Mar 10,2009	1 Year
Spectrum Analyzer	Agilent	E4446A	US44300459	Mar 10,2009	1 Year
Attenuator	Agilent	8491B	MY39262165	Mar 10,2009	1 Year

Remark:

Test Firm Name: Most Technology Service Co., Ltd. Test Firm Address: No. 5, 2nd Langshan Road, North District, Hi-tech Industrial Pa rk,Nanshan, Shenzhen, Guangdong, China FCC Registered Test Site Number: 490827



TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of MOST TECHNOLOGY SERVICE CO., LTD. The EUT was transmitting a test signal during the testing.

POWER LINE CONDUCTED INTERFERENCE: The test procedure used was ANSI Standard C63.4-2003 using a 50 U H LISN. Both Lines were observed. The bandwidth of the receiver was 10kHz with an appropriate sweep speed. The ambient temperature of the EUT was 25 with a humidity of 58%.

RADIATION INTERFERENCE: The test procedure used was ANSI Standard C63.4-2003 using a ANRITSU spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. The ambient temperature of the EUT was 25 with a humidity of 58%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer and cable loss. The antenna correction factors and cable loss are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example: Freq (MHz) METER READING + ACF + CABLE = FS 33 20 dBuV + 10.36 dB + 0.9 dB= 31.26 dBuV/m @ 3m

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings were converted to average readings based on the duration of "ON" time.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI Standard C63.4-2003 10.1.7 with the EUT 40 cm from the vertical ground wall.

APPLICANT: Innovation Specialties FCC ID: VMH-10100S00



APPLICANT:	INNOVATION	SPECIALTIES				
FCC ID:	VMH-10100S	00				
NAME OF TEST:	POWER LINE	CONDUCTED IN	ITERFERENCE			
RULES PART NUMBER:	15.207(a), DA 00-705					
REQUIREMENTS:						
Frequency of Emission 0.15-0.5 0.5-5 5-30	(MHz) 6	Conducted Quasi-peak 66 to 56 * 56 60	Limit (dBuV) Average 56 to 46 * 46 50			
			50			

* Decreases with the logarithm of the frequency.

TEST PROCEDURE: ANSI STANDARD C63.4-2003





No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.2020	38.67	11.99	50.66	63.53	-12.87	QP	
2	0.2300	35.85	11.80	47.65	62.45	-14.80	QP	
3	0.3900	34.36	10.73	45.09	58.06	-12.97	QP	
4	0.5180	31.12	10.00	41.12	56.00	-14.88	QP	
5	0.7660	27.66	10.00	37.66	56.00	-18.34	QP	
6	0.9340	26.79	10.00	36.79	56.00	-19.21	QP	





No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1820	38.93	10.92	49.85	64.39	-14.54	QP	
2	0.2380	36.82	11.75	48.57	62.17	-13.60	QP	
3	0.2780	35.03	11.48	46.51	60.88	-14.37	QP	
4 *	0.3660	34.29	10.89	45.18	58.59	-13.41	QP	
5	0.6220	29.78	10.00	39.78	56.00	-16.22	QP	
6	0.7820	28.42	10.00	38.42	56.00	-17.58	QP	



APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.209(a), DA 00-705

REQUIREMENTS:

30-88 MHz 40 dBuV/m @3m 88-216 MHz 43.5 dBuV/m @3m 216-960 MHz 46 dBuV/m @3m 960-1000 MHz 54 dBuV/m @3m Above 1000MHz 74 dBuV/m(Peak) @3m, 54 dBuV/m(AV) @3m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 Db BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

- REMARK: 1. After the preliminary test for all channels, CH0 (920.150MHz),CH26 (922.516MHz), CH51 (924.791MHz) was found to produce the highest emission level. Then, the EUT configuration and cable configuration of the CH0 (920.150MHz),CH26 (922.516MHz), CH51 (924.791MHz) test mode of highest emission mode was chosen for all final test item
 - 2. Emissions attenuated more than 20 dB below the permissible value are not reported.

Frequency	Antenna	Emission Level (dBuV/m)			FCC 15 Subpart C				
(MHz)	Polarization	Avg	QP	Peak	Limit(dBuV/m)				
					· · · · ·				
Low CH(920.150MHz)									
136.79	Vertical		30.10	33.10	43.5				
1840.32	Vertical	33.09		36.19	54.0				
2760.47	Vertical	32.25		35.01	54.0				
3680.64	Vertical	31.42		34.04	54.0				
4600.75	Vertical			33.63	54.0				
5520.91	Vertical			33.41	54.0				
6441.07	Vertical			32.01	54.0				
7361.22	Vertical			32.09	54.0				
8281.36	Vertical			31.19	54.0				
9201.51	Vertical			31.01	54.0				
89.05	Horizontal		30.91	32.89	43.5				
1840.33	Horizontal	34.57		36.23	54.0				
2760.46	Horizontal	32.54		34.21	54.0				
3680.61	Horizontal			33.67	54.0				
4600.77	Horizontal	31.09		34.21	54.0				
5520.92	Horizontal			33.42	54.0				
6441.08	Horizontal			32.09	54.0				
7361.24	Horizontal			30.29	54.0				
8281.35	Horizontal			29.98	54.0				
9201.51	Horizontal			30.01	54.0				



APPLICANT: INNOVATION SPECIALTIES

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- **REMARK:** 1. After the preliminary test for all channels, CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) was found to produce the highest emission level. Then, the EUT configuration and cable configuration of the CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) test mode of highest emission mode was chosen for all final test item
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Frequency	Antenna	Emission Level (dBuV/m)			FCC 15 Subpart C				
(MHz)	Polarization	Avg	QP	Peak	Limit(dBuV/m)				
					Υ Υ				
Middle CH(922.516MHz)									
136.79	Vertical		30.46	33.43	43.5				
1845.033	Vertical	32.98		36.20	54.0				
2767.547	Vertical	33.01		35.21	54.0				
3690.063	Vertical	31.56		34.43	54.0				
4612.581	Vertical			33.62	54.0				
5535.095	Vertical			33.39	54.0				
6457.613	Vertical			32.21	54.0				
7380.129	Vertical			32.74	54.0				
8302.644	Vertical			31.20	54.0				
9225.162	Vertical			31.10	54.0				
89.05	Horizontal		30.90	33.09	43.5				
1845.032	Horizontal	34.51		36.34	54.0				
2767.547	Horizontal	32.47		34.20	54.0				
3690.064	Horizontal			33.70	54.0				
4612.582	Horizontal			33.24	54.0				
5535.096	Horizontal			33.51	54.0				
6457.613	Horizontal			32.14	54.0				
7380.128	Horizontal			30.32	54.0				
8302.645	Horizontal			30.00	54.0				
9225.162	Horizontal			30.17	54.0				



APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.209(a), DA 00-705

REQUIREMENTS:

30-88 MHz 40 dBuV/m @3m 88-216 MHz 43.5 dBuV/m @3m 216-960 MHz 46 dBuV/m @3m 960-1000 MHz 54 dBuV/m @3m Above 1000MHz 74 dBuV/m(Peak) @3m, 54 dBuV/m(AV) @3m EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 Db BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

REMARK: 1. After the preliminary test for all channels, CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) was found to produce the highest emission level. Then, the EUT configuration and cable configuration of the CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) test mode of highest emission mode was chosen for all final test item

^{2.} Emissions attenuated more than 20 dB below the permissible value are not reported.

Frequency	Antenna	Emission Level (dBuV/m)			FCC 15 Subpart C					
(MHz)	Polarization	Avg	QP	Peak	Limit(dBuV/m)					
					, , , , , , , , , , , , , , , , , , ,					
	High CH(924.791MHz)									
136.79	Vertical		30.46	33.42	43.5					
1849.584	Vertical	32.90		36.22	54.0					
2774.375	Vertical	33.12		35.32	54.0					
3699.162	Vertical	31.54		34.73	54.0					
4623.951	Vertical			33.62	54.0					
5548.746	Vertical			33.39	54.0					
6473.538	Vertical			32.21	54.0					
7398.328	Vertical			32.56	54.0					
8323.119	Vertical			31.21	54.0					
9247.912	Vertical			30.12	54.0					
89.05	Horizontal		30.82	33.12	43.5					
1849.583	Horizontal	34.26		36.34	54.0					
2774.371	Horizontal	32.39		34.24	54.0					
3699.163	Horizontal	31.58		33.65	54.0					
4623.954	Horizontal			33.23	54.0					
5548.746	Horizontal			33.50	54.0					
6473.537	Horizontal			32.10	54.0					
7398.328	Horizontal			30.36	54.0					
8323.118	Horizontal			30.02	54.0					
9247.913	Horizontal			30.15	54.0					



TEST PROCEDURE: ANSI Standard C63.4-2003 using a ANRITSU spectrum analyzer with a pre-selector and an appropriate antenna. The resolution bandwidth of spectrum analyzer was 100 kHz below 1 GHz and 1 MHz above 1 GHz. An appropriate sweep speed was used. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.



APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

NAME OF TEST: 20dB Bandwidth Test

RULES PART NUMBER: 15.247(a)(1)(i), DA 00-705

REQUIREMENTS:The 20dB bandwidth must be less than 250kHz.

REMARK: After the preliminary test for all channels, CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) was found to produce the worst frequency output. Then, the EUT configuration and cable configuration of the CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) test mode was chosen for all final test item

TEST RESULTS:

Test Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
Low CH:920.150MHz	67	250	PASS
Middle CH:922.516MHz	67	250	PASS
High CH:924.791MHz	68	250	PASS









Middle CH: 922.516MHz





CH Middle: 924.791MHz



APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

NAME OF TEST: Number of Hopping Frequency Test

RULES PART NUMBER: 15.247(a)(1)(i), DA 00-705

REQUIREMENTS:If the 20dB bandwidth is less than 250KHz, the system shall use at least 50 hopping frequencies. If the 20dB bandwidth is 250kHz or greater, the system shall use at least 25 hopping frequencies.

TEST RESULTS: There are 52 hopping channels





- **APPLICANT:** INNOVATION SPECIALTIES
- FCC ID: VMH-10100S00

NAME OF TEST: Time of occupancy of A Hopping Channel Test

RULES PART NUMBER: 15.247(a)(1)(i), DA 00-705

REQUIREMENTS: If the 20Db bandwidth is less than 250kHz, Dwell time<=0.4 Seconds in a 20 second period. If the 20Db bandwidth is 250kHz or greater, Dwell time<=0.4 seconds in a 10 second Period.

TEST RESULTS: Time of occupancy=60 timies/1200s*20s*46ms=46ms The Time of occupancy is smaller than 400ms. So the EUT complies is meet 15.247 (a)(1)(i)











APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

NAME OF TEST: Carrier Frequency Separation Test

RULES PART NUMBER: 15.247(a)(1), DA 00-705

- **REQUIREMENTS:**Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25KHz or the 20dB Bandwidth Of the hopping channel, whichever is greater.
- REMARK: After the preliminary test for all channels, CH0 (920.150MHz), CH26
 (922.516MHz), CH51 (924.791MHz) was found to produce the worst frequency
 output. Then, the EUT configuration and cable configuration of the CH0
 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) test mode was chosen for
 all final test item

TEST RESULTS:

Test Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Conclusion
Low CH:920.150MHz	93	>68	PASS
Middle CH:922.516MHz	93	>68	PASS
High CH:924.791MHz	91	>68	PASS





Low CH: 920.150MHz











APPLICANT: INNOVATION SPECIALTIES

FCC ID: VMH-10100S00

NAME OF TEST: Maximum Peak Output Power Test

RULES PART NUMBER: 15.247 (b)(2), DA 00-705

- **REQUIREMENTS:** The transmitter output was connected to a power meter via a Attenuator, use the power meter to read out the peak output power, the peak output power shall be not exceed 1w or 30dBmw .
- REMARK: After the preliminary test for all channels, CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) was found to produce the worst frequency output. Then, the EUT configuration and cable configuration of the CH0 (920.150MHz), CH26 (922.516MHz), CH51 (924.791MHz) test mode was chosen for all final test item

TEST RESULTS:

Test Frequency (MHz)	Read(PK) (dBm)	Cable loss (dB)	Atten loss (dB)	Result (dBm)	Limit (dBm)	Conclusion
Low CH (920.150MHz)	6.29	0.6	20	26.89	30	PASS
Middle CH (922.516MHz)	6.30	0.6	20	26.90	30	PASS
High CH (924.791MHz)	6.33	0.6	20	26.93	30	PASS



APPLICANT:	INNOVATION SPECIALTIES
FCC ID:	VMH-10100S00
NAME OF TEST:	Band Edge Compliance Test
RULES PART NUMBER:	15.205(b), 15.247(d), DA 00-705

TEST RESULTS:

Band Edge-Low CH









- APPLICANT: Innovation Specialties
- FCC ID: VMH-10100S00
- NAME OF TEST: Antenna Requirement
- RULES PART NUMBER: 15.205(b),15.247(d), DA 00-705
- **REQUIREMENTS:** For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greate than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.
- ANTENNA SPECIFICATION for EUT: The antenna used for this product is designed that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna .The maximum peak Gain of this antenna is only 5dBi.