

Operating Frequency Stability Measurements.

Summary Conclusion: The 13.56 MHz fundamental emission was verified to be within the +/-0.01% (+/-1.356 kHz) tolerance when the EUT was subjected to line voltage and temperature variations specified in Part 15.225(e)

The operating frequency of the Contactless Card Reader was measured to ensure the device operates outside precluded frequency bands. All measurements were made with a 50 ohm dummy load attached to the EUT. A spectrum analyzer/EMI receiver coupled with a close field magnetic probe was used to read the operating frequency.

Stability with respect to input voltage.

Measurements were made at room ambient (25C) at nominal voltage (120 VAC) and while varying the AC line voltage to 85% and 115% of nominal. Operating frequency measurements were made at intervals of 0, 2, 5, and 10 minutes of operating time for each voltage level.

Stability with respect to ambient temperature.

Measurements were made at temperature extremes of +50 deg. C. and -20 deg. C. to ensure the operating frequency did not vary with temperature. The environmental chamber was allowed to stabilize at least 30 minutes at each operating temperature prior to taking frequency measurements. Operating frequency measurements were made at time intervals of 0, 2, 5, and 10 minutes of operating time.

Equipment Tested: Panasonic Contractless Smart Card Reader (RFID 13.56 MHz)

Test sample model/serial number : ZU-187OCT221 71 GSO13

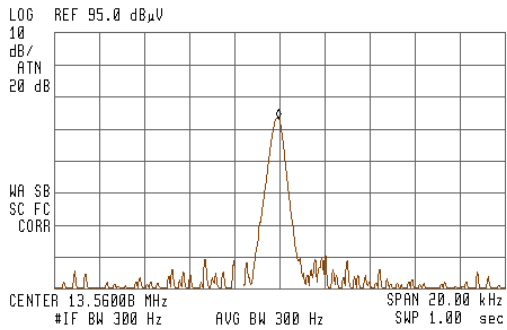
Test Equipment Use List			
Model	ID	Calibration Due	Description
Fluke 87	TC306M17200	1/09/2008	Digital Multimeter
Staco E1010VA	TC455V0880	N/A	Variac
EMCO 7405	N/A	N/A	H Field Probe
HP 8546A	TC455R09800	7/27/2007	EMI Receiver
HP8594E	TC402A00500	CBU	Spectrum Analyzer
Thermotron SE	TC455E06000	12/4/2007	Environmental Chamber

Test Data			
Time (min)	Voltage (VAC)	Temp. C	Frequency (MHz)
0	120	25	13.56003
2	120	25	13.56003
5	120	25	13.56003
10	120	25	13.55998
0	102	25	13.55998
2	102	25	13.55998
5	102	25	13.55998
10	102	25	13.55998
0	138	25	13.55998
2	138	25	13.55998
5	138	25	13.55998
10	138	25	13.55998
0	120	50	13.55995
2	120	50	13.55995
5	120	50	13.55995
10	120	50	13.55995
0	120	-20	13.55985
2	120	-20	13.55985
5	120	-20	13.55985
10	120	-20	13.55985

Tests Performed by: Bob Sykes on May 1, 2007

13:15:18 MAY 01, 2007

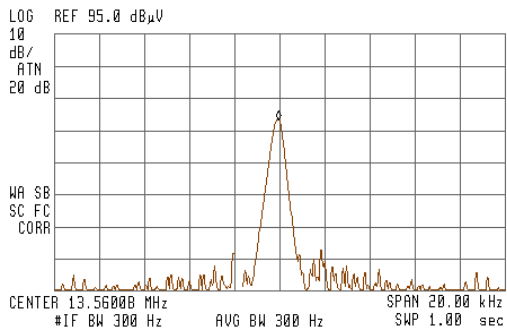
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.56003 MHz
68.08 dB μ V



Voltage = 120 VAC Time = 0 min.

13:20:14 MAY 01, 2007

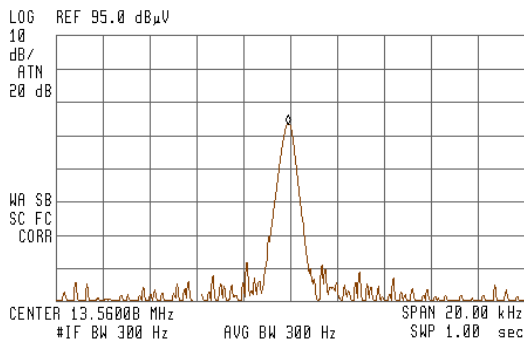
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.56003 MHz
68.27 dB μ V



Voltage = 120 VAC Time = 5 min.

13:25:48 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.39 dB μ V

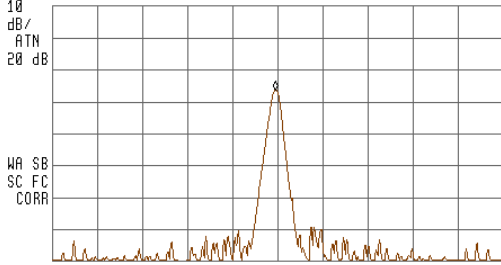


Voltage = 120 VAC Time = 10 min.

13:33:02 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.47 dB μ V

LOG REF 95.0 dB μ V



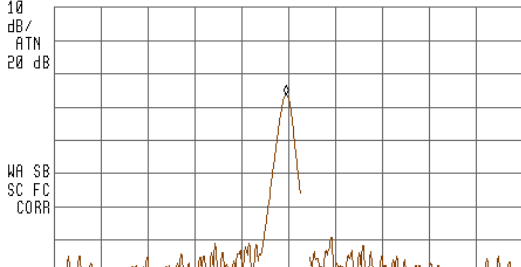
CENTER 13.56000 MHz SPAN 20.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Voltage = 102 VAC Time = 0 min.

13:38:53 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.45 dB μ V

LOG REF 95.0 dB μ V



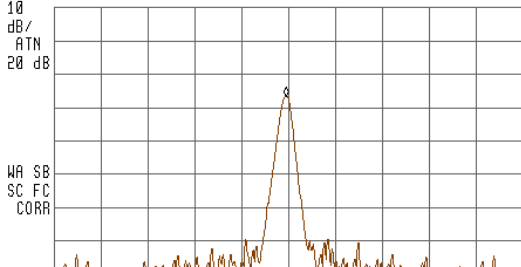
CENTER 13.56000 MHz SPAN 20.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Voltage = 102 VAC Time = 5 min.

13:59:57 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.40 dB μ V

LOG REF 95.0 dB μ V

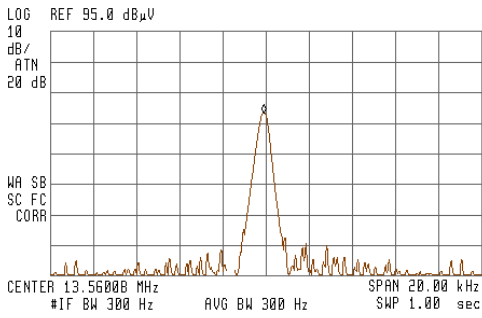


CENTER 13.56000 MHz SPAN 20.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Voltage = 102 VAC Time = 10 min.

13:53:17 MAY 01, 2007

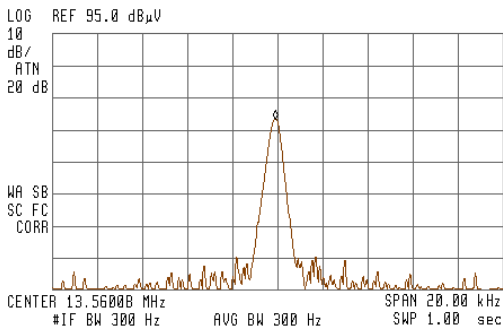
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.27 dB μ V



Voltage = 138 VAC Time = 0 min.

13:59:57 MAY 01, 2007

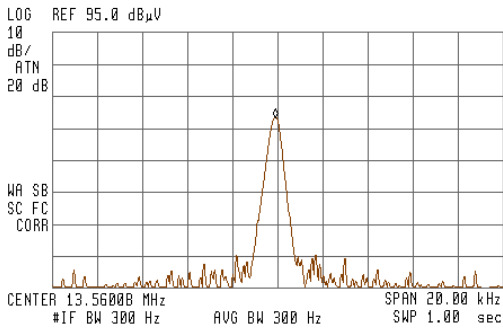
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.40 dB μ V



Voltage = 138 VAC Time = 5 min.

13:59:57 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55998 MHz
68.40 dB μ V

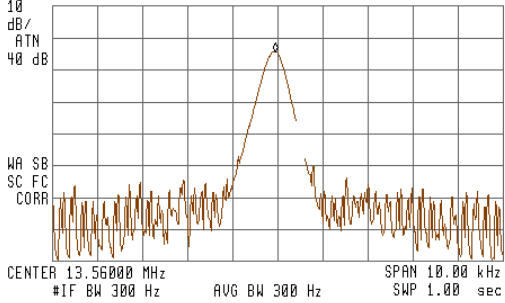


Voltage = 138 VAC Time = 10 min.

14:39:01 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55995 MHz
100.70 dB μ V

LOG REF 115.0 dB μ V

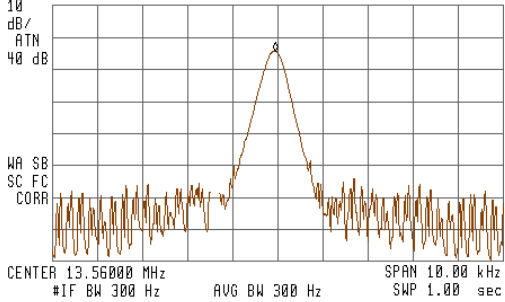


Temp = 50C Time = 0 min.

14:46:39 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55995 MHz
100.66 dB μ V

LOG REF 115.0 dB μ V

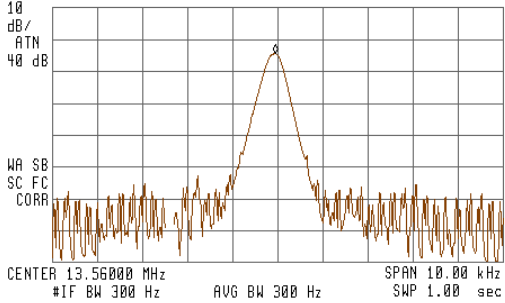


Temp = 50C Time = 5 min.

15:01:49 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55995 MHz
100.48 dB μ V

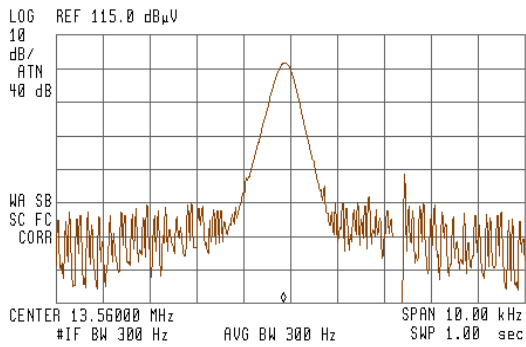
LOG REF 115.0 dB μ V



Temp = 50C Time = 10 min.

15:44:31 MAY 01, 2007

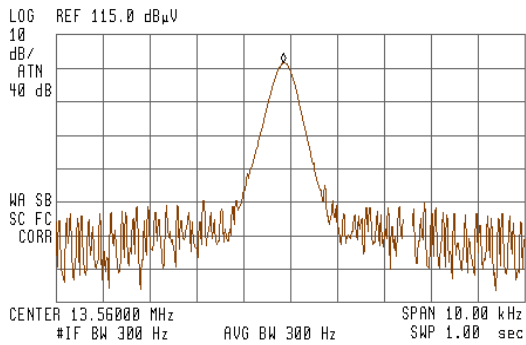
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55985 MHz
35.45 dB μ V



Temp = -20C Time = 0 min.

15:54:31 MAY 01, 2007

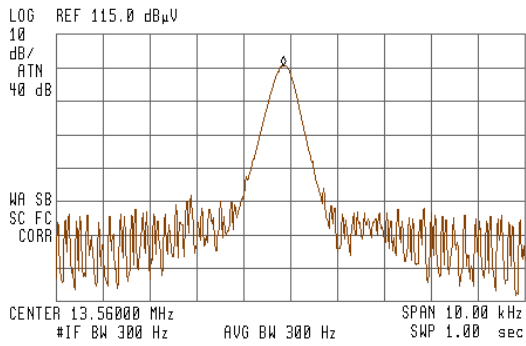
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55985 MHz
106.40 dB μ V



Temp = -20C Time = 10 min.

16:17:01 MAY 01, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.55985 MHz
105.60 dB μ V



Temp = -20C Time = 23 min.