TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: 1619-20XPL in host NY MTA Subway

To: FCC Part 15.225: 2008 Subpart C

Test Report Serial No:
RFI/RPT1/RP75001JD01A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	pp R. Graham
Checked By:	R. Graham
Signature:	R. Graham
Date of Issue:	15 October 2009

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1. Customer Information

Company Name:	VeriFone Inc.
Address:	Salamander Quay South Park Lane Harefield Middlesex UB9 6NY

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	17 June 2009 to 25 June 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
Part 15.107(a)	Idle Mode AC Conducted Emissions	AC Mains	✓
Part 15.109(a)	Idle Mode Radiated Spurious Emissions	Enclosure	✓
Part 15.207	Transmitter AC Conducted Emissions	AC Mains	✓
Part 15.225(a)(b)(c)(d)	Transmitter Fundamental Field Strength	Antenna	✓
Part 15.209(a), 15.225(d)	Transmitter Radiated Spurious Emissions	Antenna	✓
Part 15.209(a) 15.225(c)(d)	Transmitter Band Edge Radiated Emissions	Antenna	✓
Part 2.1049	Transmitter 20 dB Bandwidth	Antenna	✓
Part 15.225(e)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2003)
Title:	American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Verifone
Model Name or Number:	1619-20XPL
Serial Number:	None Stated
FCC ID:	B321619-20XPL

3.2. Description of EUT

The equipment under test was a 13.56 MHz RFID card reader module fitted in AC mains powered host NY MTA Subway.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Keypad with LCD Interface
Brand Name:	Verifone
Model Name or Number:	NY MTA Subway Contactless Card Pin Entry
Serial Number:	None Stated

Description:	Power Supply
Brand Name:	Mean Well
Model Name or Number:	RS-25-24
Serial Number:	None Stated

Description:	RFID Demo Card
Brand Name:	MasterCard
Model Name or Number:	MT MYA Subway Contactless Demo Card
Serial Number:	None Stated

3.5. Additional Information Related to Testing

Tested Technology:	RFID	
Transmit Frequency:	13.56 MHz	
Power Supply Requirement:	Nominal	120 V
	Minimum	102 V
	Maximum	138 V
Tested Temperature:	Minimum	-20°C
	Maximum	50°C

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at 13.56 MHz with a modulated carrier at maximum power.
- Idle mode with the EUT in monitor mode

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Transmitter Tests - The EUT ran a number of common functions which involved the transmitter polling for a 13.56 MHz RFID chip. This mode was in a continuous cycle of approximately 5 seconds.
- Idle Tests – The EUT was set into Monitor Mode.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results

5.2.1. Idle Mode AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.107(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	32

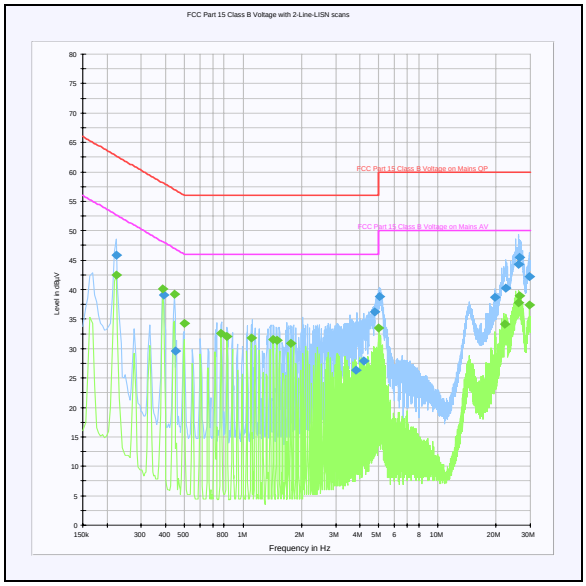
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.222000	Live	45.9	62.7	16.8	Complied
0.388500	Neutral	39.0	58.1	19.1	Complied
0.451500	Neutral	29.6	56.8	27.2	Complied
3.822000	Neutral	26.3	56.0	29.7	Complied
4.150500	Neutral	27.8	56.0	28.2	Complied
4.726500	Live	36.2	56.0	19.8	Complied
5.005500	Live	38.8	60.0	21.2	Complied
19.707000	Live	38.7	60.0	21.3	Complied
22.330500	Live	40.3	60.0	19.7	Complied
26.052000	Live	44.2	60.0	15.8	Complied
26.520000	Live	45.4	60.0	14.6	Complied
29.778000	Live	42.3	60.0	17.7	Complied

Idle Mode AC Conducted Spurious Emissions (continued)

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.222000	Live	42.4	52.7	10.3	Complied
0.384000	Neutral	40.1	48.2	8.1	Complied
0.442500	Neutral	39.2	47.0	7.8	Complied
0.496500	Neutral	34.3	46.1	11.8	Complied
0.771000	Neutral	32.6	46.0	13.4	Complied
0.825000	Neutral	32.1	46.0	13.9	Complied
1.099500	Neutral	31.8	46.0	14.2	Complied
1.432500	Neutral	31.5	46.0	14.5	Complied
1.486500	Neutral	31.5	46.0	14.5	Complied
1.761000	Neutral	30.9	46.0	15.1	Complied
4.956000	Live	33.5	46.0	12.5	Complied
22.020000	Live	34.2	50.0	15.8	Complied
26.052000	Live	37.8	50.0	12.2	Complied
26.362500	Neutral	39.0	50.0	11.0	Complied
29.773500	Neutral	37.4	50.0	12.6	Complied



5.2.2. Idle Mode Radiated Spurious Emissions

Test Summary:

FCC Part:	15.109(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	34

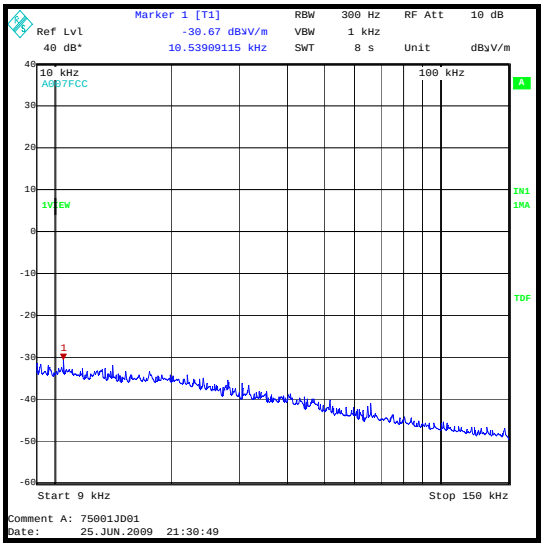
Results:

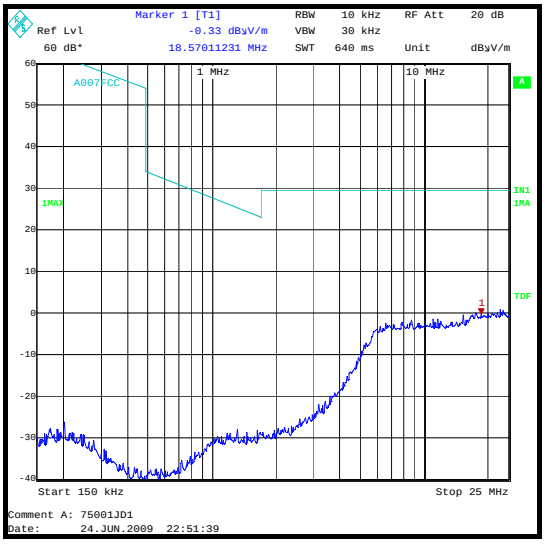
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
50.808	Vertical	36.2	40.0	3.8	Complied
161.854	Horizontal	34.9	43.5	8.6	Complied
332.588	Vertical	33.8	46.0	12.2	Complied
404.589	Vertical	34.1	46.0	11.9	Complied
485.567	Horizontal	36.8	46.0	9.2	Complied
663.231	Horizontal	36.9	46.0	9.1	Complied
748.493	Vertical	35.9	46.0	10.1	Complied
889.760	Vertical	36.5	46.0	9.5	Complied

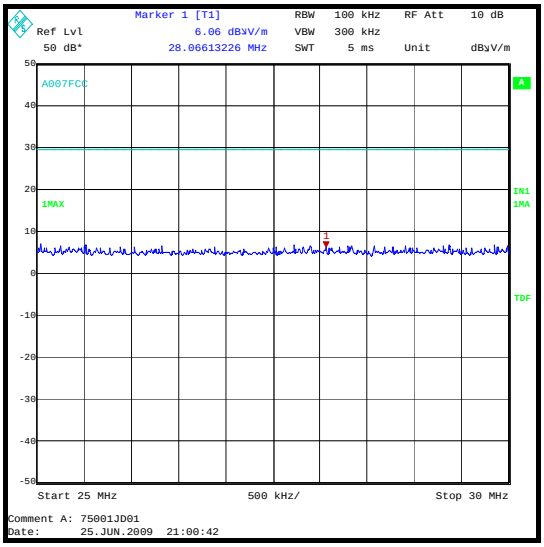
Note(s):

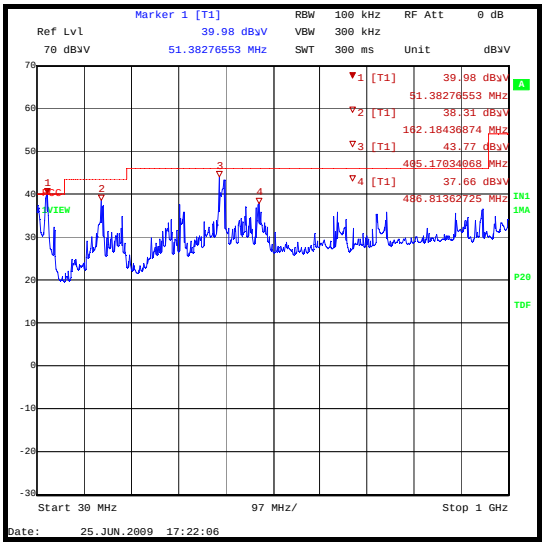
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.

Idle Mode Radiated Spurious Emissions (continued)









Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

5.2.3. Transmitter Mode AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	32

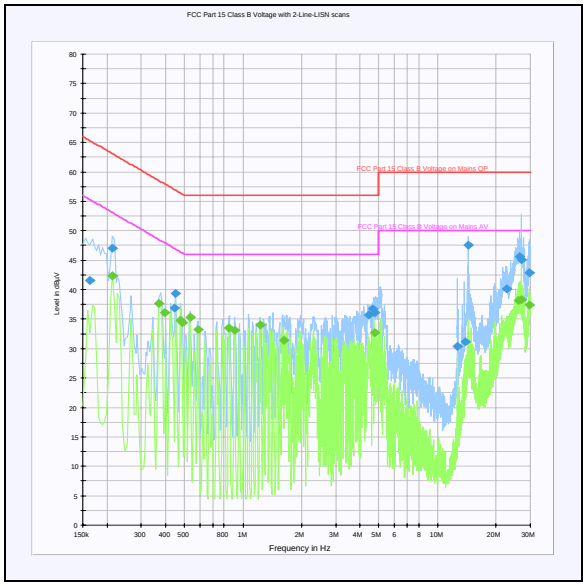
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.163500	Neutral	41.6	65.3	23.7	Complied
0.213000	Live	47.0	63.1	16.1	Complied
0.442500	Live	36.9	57.0	20.1	Complied
0.447000	Neutral	39.4	56.9	17.5	Complied
4.402500	Neutral	35.7	56.0	20.3	Complied
4.663500	Neutral	36.8	56.0	19.2	Complied
4.762500	Live	36.1	56.0	19.9	Complied
12.682500	Neutral	30.4	60.0	29.6	Complied
13.821000	Neutral	31.1	60.0	28.9	Complied
14.406000	Neutral	47.6	60.0	12.4	Complied
22.560000	Live	40.2	60.0	19.8	Complied
26.308500	Live	45.6	60.0	14.4	Complied
27.082500	Neutral	45.0	60.0	15.0	Complied
29.521500	Live	42.9	60.0	17.1	Complied

Transmitter Mode AC Conducted Spurious Emissions (continued)

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.213000	Live	42.4	53.1	10.7	Complied
0.370500	Neutral	37.6	48.5	10.9	Complied
0.393000	Live	36.1	48.0	11.9	Complied
0.478500	Live	34.8	46.4	11.6	Complied
0.487500	Neutral	34.4	46.2	11.8	Complied
0.532500	Neutral	35.4	46.0	10.6	Complied
0.586500	Neutral	33.2	46.0	12.8	Complied
0.847500	Neutral	33.5	46.0	12.5	Complied
0.906000	Neutral	33.1	46.0	12.9	Complied
1.221000	Neutral	34.0	46.0	12.0	Complied
1.630500	Neutral	31.4	46.0	14.6	Complied
4.726500	Neutral	32.7	46.0	13.3	Complied
26.164500	Live	38.2	50.0	11.8	Complied
27.163500	Neutral	38.4	50.0	11.6	Complied
29.503500	Live	37.3	50.0	12.7	Complied



5.2.4. Transmitter Fundamental Field Strength

Test Summary:

FCC Part:	15.225 (a)(b)(c)(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

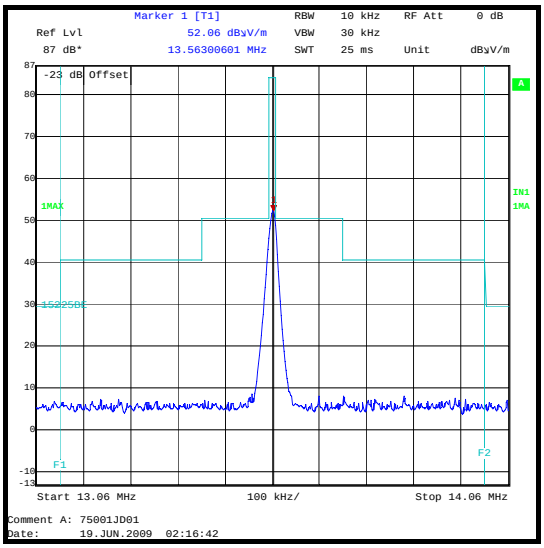
Temperature (°C):	28
Relative Humidity (%):	30

Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dBµV/m)	Limit at 30 m (dBµV/m)	Margin (dB)	Result
13.56	90° to EUT	52.0	84.0	32.0	Complied

Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. The limit is specified at a test distance of 30 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor. A transducer factor on the test equipment was used to extrapolate the result obtained at 3 metres to the required measurement distance.



5.2.5. Transmitter Radiated Spurious Emissions

Test Summary:

FCC Part:	15.209 (a), 15.225(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	30

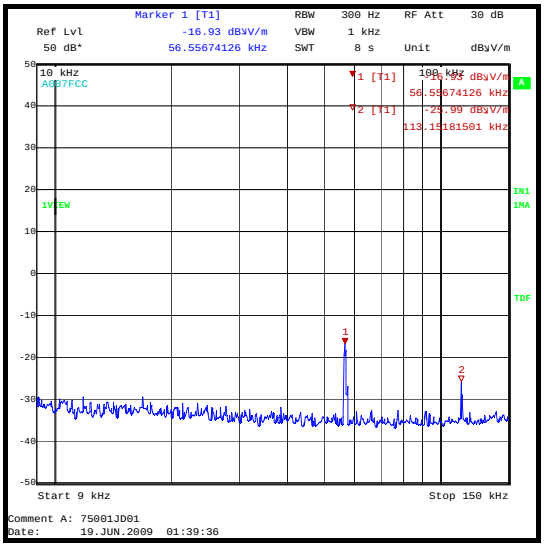
Results: Electric Field Strength Measurements

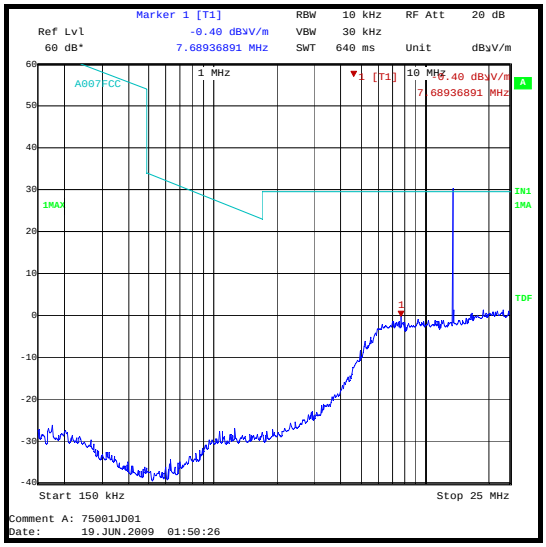
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
40.665	Horizontal	38.8	40.0	1.2	Complied
53.936	Vertical	33.4	40.0	6.6	Complied
161.899	Horizontal	35.9	43.5	7.6	Complied
404.604	Horizontal	38.6	46.0	7.4	Complied
663.2327	Vertical	39.5	46.0	6.5	Complied
728.124	Horizontal	37.7	46.0	8.3	Complied

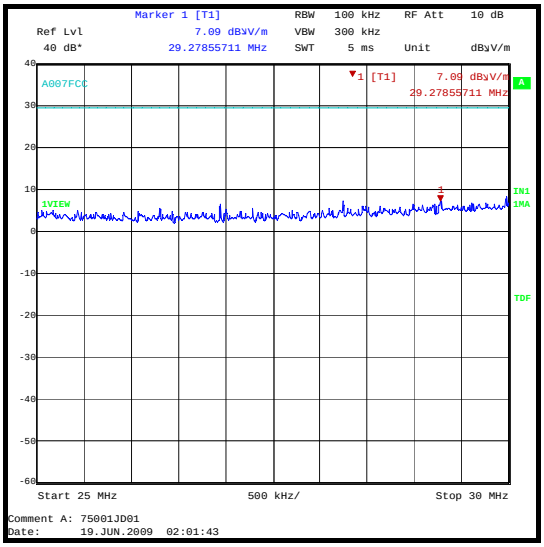
Note(s):

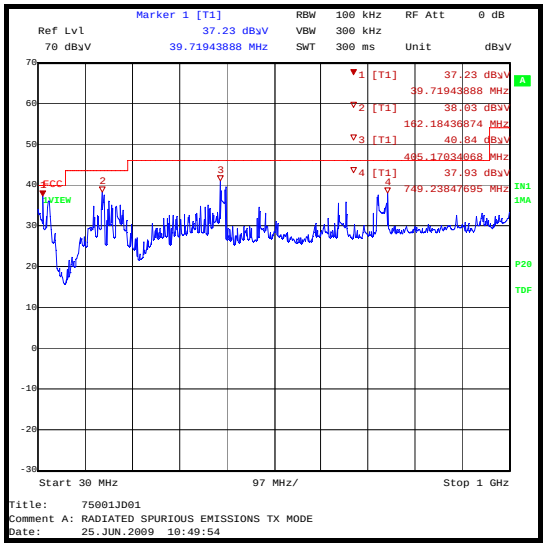
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.
3. The fundamental is displayed on the pre-scan 150 kHz to 25 MHz plot at approximately 13.5 MHz.

Transmitter Radiated Spurious Emissions (continued)









Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

5.2.6. Transmitter Radiated Emissions at Band Edges

Test Summary:

FCC Part:	15.209(a) 15.225(c)(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	30

Results: Lower Band Edge

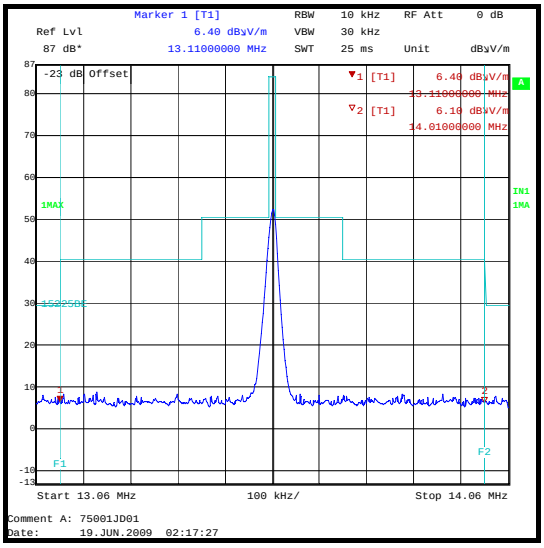
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
13.11	6.4	40.5	34.1	Complied

Results: Upper Band Edge

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
14.01	6.1	40.5	34.4	Complied

Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.



5.2.7. Transmitter 20 dB Bandwidth

Test Summary:

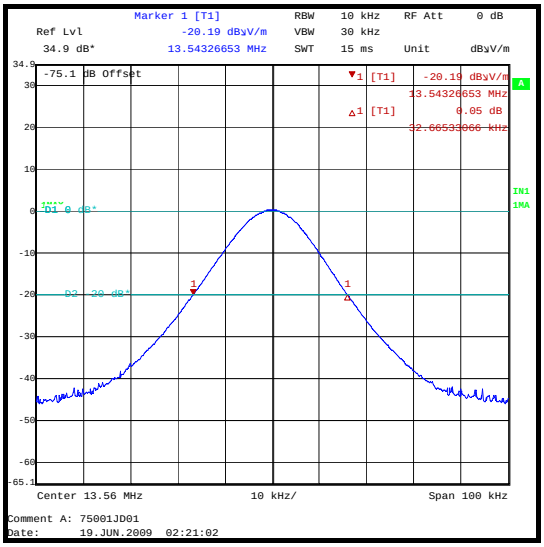
FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	30

Results:

Transmitter 20 dB Bandwidth (kHz)
32.665



5.2.8. Transmitter Frequency Stability (Temperature & Voltage Variation)

Test Summary:

FCC Part:	15.225 (e)
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.6 and relevant annexes

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	36

Results: Maximum frequency error of the EUT with variations in ambient temperature

Temp (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
-20	13.56	13.559748	252	0.00292	0.01	0.00708	Complied
20	13.56	13.559657	343	0.00253	0.01	0.00747	Complied
50	13.56	13.559573	427	0.00315	0.01	0.00685	Complied

Results: Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient temperature of 20°C

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
102	13.56	13.559658	342	0.00252	0.01	0.00748	Complied
120	13.56	13.559657	343	0.00253	0.01	0.00747	Complied
138	13.56	13.559657	343	0.00253	0.01	0.00747	Complied

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Occupied Bandwidth	13 MHz to 14 MHz	95%	±0.12 %
Frequency Stability	13 MHz to 14 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval Months)
A007	Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	29 Mar 2009	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Mar 2009	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A259	Antenna	Chase	CBL6111	1513	25 Jul 2008	12
E0513	Environmental Chamber	TAS	LT600 Series 3	23900506	Calibrated before use	-
K0001	5m SA Chamber	Rainford EMC	N/A	N/A	04 May 2009	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Aug 2008	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1249	Thermometer	Fluke	52II	88800049	09 Jul 2008	12
M1251	Multimeter	Fluke	175	89170179	23 Jun 2009	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	01 Apr 2009	12
S0539	Variac	Kikusui	PCR 1000L	13010170	Calibrated before use	-

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.