TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: IPWireless 2.3 GHz V5 Node B Model YP/VT

To: FCC Part 27: 2008 Subpart C

Test Report Serial No:
RFI/RPT4/RP73966JD01A

Supersedes Test Report Serial No:
RFI/RPT3/RP73966JD01A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:  **pp**	
Checked By: Nigel Davison 	**Report Copy No: PDF01**
Issue Date: 24 March 2009	**Test Dates: 2 February 2009 to 12 February 2009**

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1. Customer Information

Company Name:	IPWireless (UK) Ltd.
Address:	Unit 7 Greenways Business Park Bellinger Close Chippenham Wiltshire SN15 1BN England United Kingdom

2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	Radio Shelf
Brand Name:	IPWireless
Model Name or Number:	YP
Serial Number:	YP1J844000C11
FCC ID Number:	PKTNODEBYP
Date of Receipt:	02 February 2009

Description:	Digital Shelf
Brand Name:	IPWireless
Model Name or Number:	VT
Serial Number:	VT1J81800G51F
FCC ID Number:	PKTNODEBYP
Date of Receipt:	02 February 2009

Description:	Sector card 1 (part of VT digital shelf)
Brand Name:	IPWireless
Model Name or Number:	Sector card
Serial Number:	VU1J816017B1D
Date of Receipt:	02 February 2009

2.2. Description of EUT

The equipment under test was a W-CDMA Wireless Base Station comprising a radio shelf and a digital shelf intended for mounting into a 19” rack. Both shelves are connected together to create a Node B. The equipment utilizes Frequency Division Duplex technology.

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Additional Information Related to Testing

Type of Unit:	FDD Wireless base station transceiver			
Chip Rate:	3.84 Mcps			
Channel Bandwidth:	5.0 MHz			
Modulation Type:	64QAM			
Channel Spacing:	5 MHz			
Duty Cycle:	100%			
Antenna Ports:	Two x 7/16 female. Marked ANT 1 and ANT 2			
Antenna Gain:	+20 dBi (stated)			
Transmit Frequency Range:	2350 MHz to 2360 MHz			
Transmit Channels Tested:	**Channel Bandwidth (MHz)**	**Bottom Channel Frequency (MHz)**	**Centre Channel Frequency (MHz)**	**Top Channel Frequency (MHz)**
	5.0	2352.6	N/A	2357.6
Receive Frequency Range:	2305 MHz to 2315 MHz			
Receive Channels Tested:	**Channel Bandwidth (MHz)**	**Bottom Channel Frequency (MHz)**	**Centre Channel Frequency (MHz)**	**Top Channel Frequency (MHz)**
	5.0	2307.6	N/A	2312.6
Highest Fundamental Frequency	2360 MHz (operating channel) 2082 MHz (local oscillator)			
Power Supply Requirement for Testing (V_{nom} and V_{nom} ±15%):	Nominal Voltage	-48V DC		
	Minimum Voltage	-40.8V DC		
	Maximum Voltage	-55.2V DC		

2.5. Support Equipment

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

Description:	DC Power supply
Brand Name:	Agilent
Model Name or Number:	E4356A
Serial Number:	MY41000617

Description:	RF filter
Brand Name:	Not marked or stated
Model Name or Number:	CMD668
Serial Number:	000110

Description:	RF filter
Brand Name:	Not marked or stated
Model Name or Number:	CMD668
Serial Number:	000109

Description:	Sector card 1 (part of VT digital shelf)
Brand Name:	IPWireless
Model Name or Number:	Sector card
Serial Number:	VU1J816017B1D

Description:	Sector card 2 (part of VT digital shelf)
Brand Name:	IPWireless
Model Name or Number:	Sector card
Serial Number:	VU1J816017K1D

Description:	Sector card 3 (part of VT digital shelf)
Brand Name:	IPWireless
Model Name or Number:	Sector card
Serial Number:	VU1J816017P1D

Description:	30 dB RF attenuator
Brand Name:	NARDA
Model Name or Number:	776C-30
Serial Number:	VU1J816017P1D

Description:	Laptop PC
Brand Name:	Toshiba
Model Name or Number:	Satellite Pro A100
Serial Number:	670709710

3. Test Specification, Methods and Procedures

3.1. Test Specifications

Reference:	FCC Part 27: 2008
Title:	Code of Federal Regulations, (47CFR27) Subpart C Miscellaneous Wireless Communications Services
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-C-2004
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.4 (2001)
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.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

None

5. Operation of the EUT During Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated:

- Transmitting and receiving simultaneously.
- Operating on the bottom or top channel, as per each test case requirement.
- Constantly transmitting the maximum of 15 timeslots at full power (+40 dBm) with a chip rate of 3.84 Mcps.
- No tests were performed in receive/idle mode as the device is constantly transmitting.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- The radio shelf and digital shelf connected together as required and powered from a bench DC power supply.
- Three sector cards were fitted to the digital shelf. Sector 1 card was connected to the radio shelf via the fibre optic cables. Sector 2 and 3 cards were not used during the testing and were only fitted in order to fill the card slots. This is a standard configuration of the EUT.
- The laptop PC was connected to the Ethernet port on the digital shelf by a CAT5 cable. A bespoke application on the laptop PC was used to configure the RF parameters of the EUT as required.
- RF Conducted emission tests - One RF port was connected to the measurement equipment using previously calibrated RF cables, filters and attenuators. The unused RF port was terminated with suitable loads or attenuators. Measurements were performed alternately or on both ports as required.
- AC Conducted emission tests – The Client stated they do not provide a power supply for use with the EUT, the choice is left to the end user. A -48V battery supply or -48V mains powered supply may be used, therefore AC conducted emissions tests were performed. The EUT was connected to a suitable bench power supply powered from a 120 VAC 60 Hz mains supply and the output set to 48 VDC. The power supply input was connected to the mains supply via a LISN and the output connected to the EUT. Most ports on the EUT were terminated and the Client stated that un-terminated ports were either inoperative or disabled. The EUT was configured to transmit at full power on the bottom channel.
- RF Radiated emission/case radiation tests - Both RF ports were terminated with suitable loads or attenuators. The EUT was connected to a suitable bench power supply powered from a 120 VAC 60 Hz mains supply and the output set to 48 VDC. Measurements were performed with the test system antenna polarised in the vertical and horizontal planes, the highest level was recorded. Most ports on the EUT were terminated and the Client stated that un-terminated ports were either inoperative or disabled.

6. Summary of Test Results

Range of Measurements	FCC Reference	Port Type	Result
Transmitter AC Conducted Spurious Emissions (150 kHz to 30 MHz)	FCC Part 15.207	AC Mains	Complied
Transmitter Carrier Output Power and EIRP	FCC Part 2.1046 FCC Part 27.50	Antenna Terminals	Complied
Occupied Bandwidth	FCC Part 2.1049	Antenna Terminals	Complied
Frequency Stability (Temperature Variation)	FCC Part 2.1055 FCC Part 27.54	Antenna Terminals	Complied
Frequency Stability (Voltage Variation)	FCC Part 2.1055 FCC Part 27.54	Antenna Terminals	Complied
Conducted Emissions	FCC Part 2.1051 FCC Part 27.53	Antenna Terminals	Complied
Conducted Emissions Band Edge	FCC Part 2.1051 FCC Part 27.53	Antenna Terminals	Complied
Radiated Spurious Emissions	FCC Part 2.1051 FCC Part 27.53	Enclosure	Complied
Transmitter Radiated Emissions Band Edge	FCC Part 2.1051 FCC Part 27.53	Enclosure	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire RG24 8AH, England.

7. Measurements, Examinations and Derived Results

7.1. General Comments

7.1.1. This section contains test results only.

7.1.2. 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 8 for details of measurement uncertainties.

7.2. Transmitter AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.207

Environmental Conditions:

Temperature Variation (°C):	19 to 19
Relative Humidity Variation (%):	35 to 35

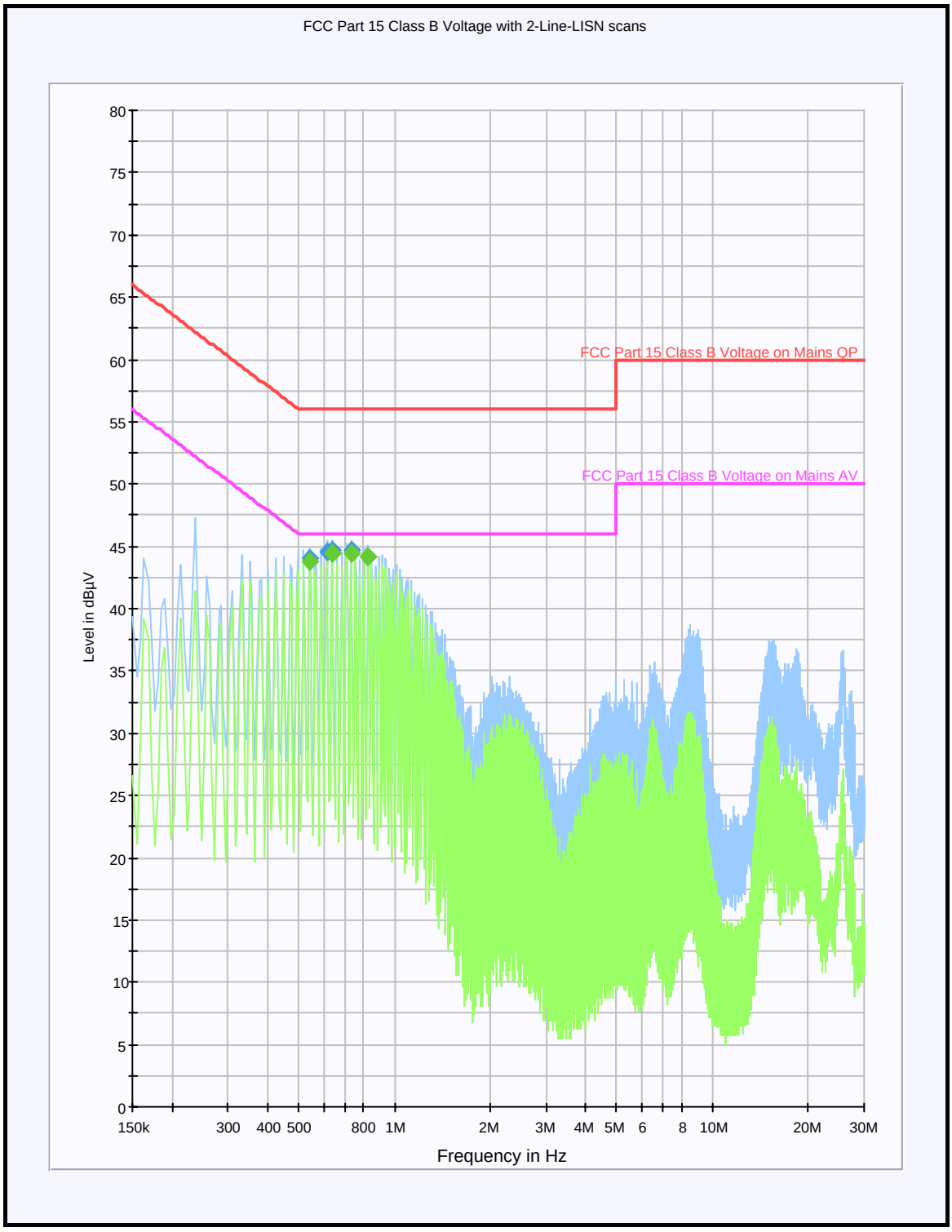
Results: Quasi-Peak Detector Measurements

Frequency (MHz)	Line	Q-P Level (dBμV)	Q-P Limit (dBμV)	Margin (dB)	Result
0.541500	Live 1	44.0	56.0	12.0	Complied
0.613500	Live 1	44.5	56.0	11.5	Complied
0.636000	Live 1	44.7	56.0	11.3	Complied
0.730500	Live 1	44.7	56.0	11.3	Complied
0.825000	Live 1	44.2	56.0	11.8	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Av. Level (dBμV)	Av. Limit (dBμV)	Margin (dB)	Result
0.541500	Live 1	43.8	46.0	2.2	Complied
0.636000	Live 1	44.5	46.0	1.5	Complied
0.730500	Live 1	44.5	46.0	1.5	Complied
0.825000	Live 1	44.2	46.0	1.8	Complied

Transmitter AC Conducted Spurious Emissions (continued)



7.3. Transmitter Carrier Output Power and Effective Isotropic Radiated Power (EIRP)

Test Summary:

FCC Part:	2.1046 and 27.50(a)(1)

Environmental Conditions:

Temperature Variation (°C):	26 to 26
Relative Humidity Variation (%):	42 to 42

Results:

Port	Frequency (MHz)	Conducted RF Power (dBm)*	Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
1	2352.6	40.2	20	60.2	30.2	33.0	2.8	Complied
1	2357.6	40.1	20	60.1	30.1	33.0	2.9	Complied
2	2352.6	40.6	20	60.6	30.6	33.0	2.4	Complied
2	2357.6	40.4	20	60.4	30.4	33.0	2.6	Complied

Note(s):

1. Measurements were performed on both channels and both ports.
2. An average power meter and associated thermal power sensor were used to perform power measurements.
3. EIRP was calculated by adding the Client's declared antenna gain to the measured conducted RF output power.

7.4. Transmitter Occupied Bandwidth

Test Summary:

FCC Part:	2.1049

Environmental Conditions:

Temperature Variation (°C):	26 to 26
Relative Humidity Variation (%):	42 to 42

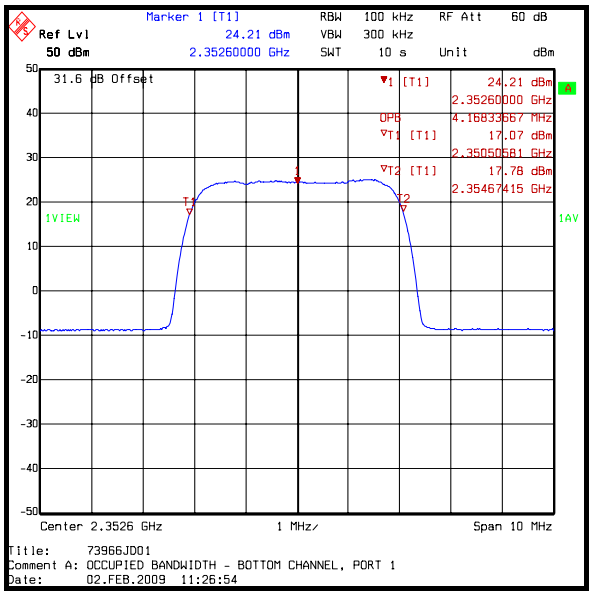
Results:

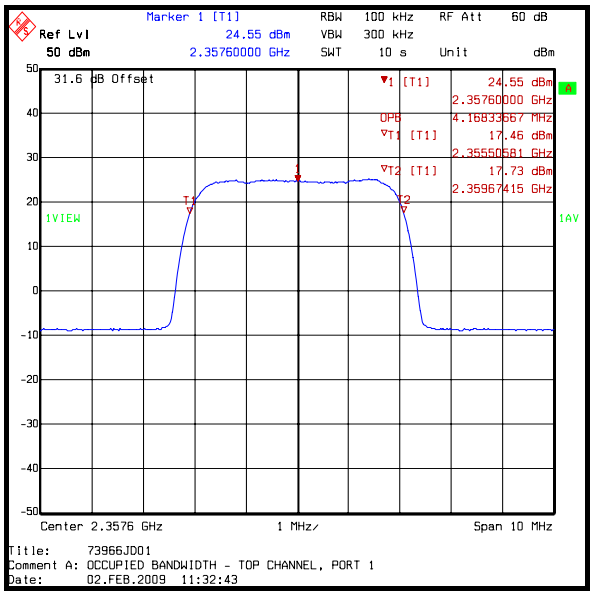
Port	Frequency	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
1	2352.6	100	300	4.168
1	2357.6	100	300	4.168
2	2352.6	100	300	4.148
2	2357.6	100	300	4.168

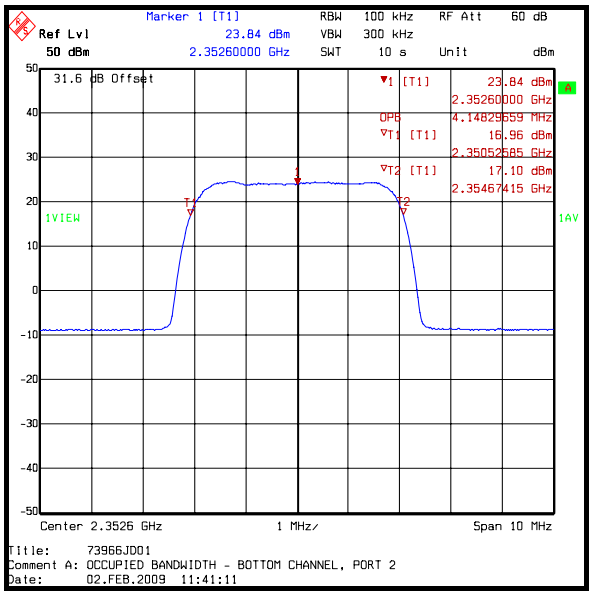
Note(s):

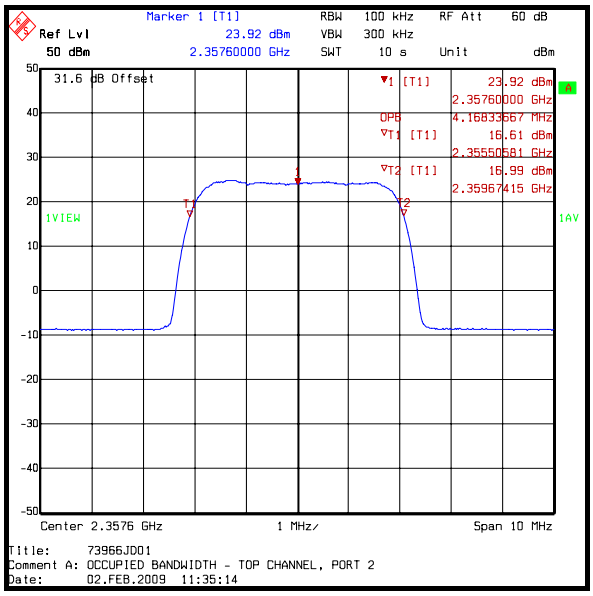
1. The EUT was configured to transmit on 15 timeslots at maximum power.
2. Tests were performed on both channels and both ports.
3. The occupied bandwidth function on a spectrum analyser was used to perform bandwidth measurements.

Transmitter Occupied Bandwidth (continued)









7.4.1. Transmitter Frequency Stability - Temperature Variation

Test Summary:

FCC Part:	2.1055(a)(1) and 27.54

Environmental Conditions:

Temperature Variation (°C):	23 to 26
Relative Humidity Variation (%):	22 to 24

Results: Bottom channel / Block A / 2350 to 2355 MHz / Port 1

Temp (ºC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower block edge to lower -20 dB point (kHz)	Δ Upper block edge to upper -20 dB point (kHz)	Result
-30	2350.28537	2354.89459	285.37	105.41	Complied
-20	2350.25534	2354.88507	255.34	114.93	Complied
-10	2350.27538	2354.88507	275.38	114.93	Complied
0	2350.27555	2354.89459	275.55	105.41	Complied
10	2350.27542	2354.88557	275.42	114.43	Complied
20	2350.27538	2354.89459	275.38	105.41	Complied
30	2350.29538	2354.88557	295.38	114.43	Complied
40	2350.27635	2354.88458	276.35	115.42	Complied
50	2350.29539	2354.89459	295.39	105.41	Complied

Results: Bottom channel / Block A / 2350 to 2355 MHz / Port 2

Temp (ºC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-30	2350.26534	2354.88507	265.34	114.93	Complied
-20	2350.25534	2354.88507	255.34	114.93	Complied
0	2350.25551	2354.89459	255.51	105.41	Complied
20	2350.27538	2354.89459	275.38	105.41	Complied
50	2350.29539	2354.89459	295.39	105.41	Complied

Transmitter Frequency Stability - Temperature Variation (continued)

Results: Top channel / Block B / 2355 to 2360 MHz / Port 1

Temp (ºC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-30	2355.26533	2359.88457	265.33	115.43	Complied
-20	2355.28537	2359.89509	285.37	104.91	Complied
-10	2355.08517	2359.69469	85.17	305.31	Complied
0	2355.08517	2359.69469	85.17	305.31	Complied
10	2355.28537	2359.89559	285.37	104.41	Complied
20	2355.28537	2359.88457	285.37	115.43	Complied
30	2355.28537	2359.89559	285.37	104.41	Complied
40	2355.28537	2359.89459	285.37	105.41	Complied
50	2355.28537	2359.88457	285.37	115.43	Complied

Results: Top channel / Block B / 2355 to 2360 MHz / Port 2

Temp (ºC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-20	2355.28537	2359.89509	285.37	104.91	Complied
0	2355.06513	2359.69469	65.13	305.31	Complied
20	2355.26533	2359.90461	265.33	95.39	Complied
40	2355.28537	2359.89459	285.37	105.41	Complied
50	2355.26533	2359.89459	265.33	105.41	Complied

Transmitter Frequency Stability - Temperature Variation – (continued)

Note(s):

1. Temperature extremes - Full testing was performed on antenna Port 1, all numerical and graphical results are shown. Random testing was performed on antenna port 2, only numerical results are shown.
2. Voltage extremes - Full testing was performed on antenna Port 1, all numerical and graphical results are shown. Random testing was performed on antenna port 2, only numerical results are shown.
3. A spectrum analyser was used to perform frequency measurements.
4. Markers were placed at the upper and lower -20 dB points to identify the distance from the block/band edge. The frequencies of the -20 dB points were recorded.
5. Measurements were also performed with a reduced resolution bandwidth to determine absolute accuracy. This technique identifies the carrier breakthrough. A marker was placed on the carrier breakthrough point and the frequency recorded.

Limits:

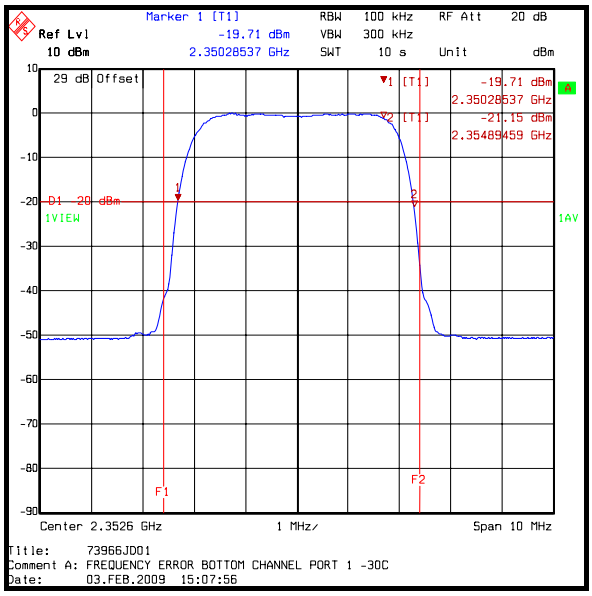
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

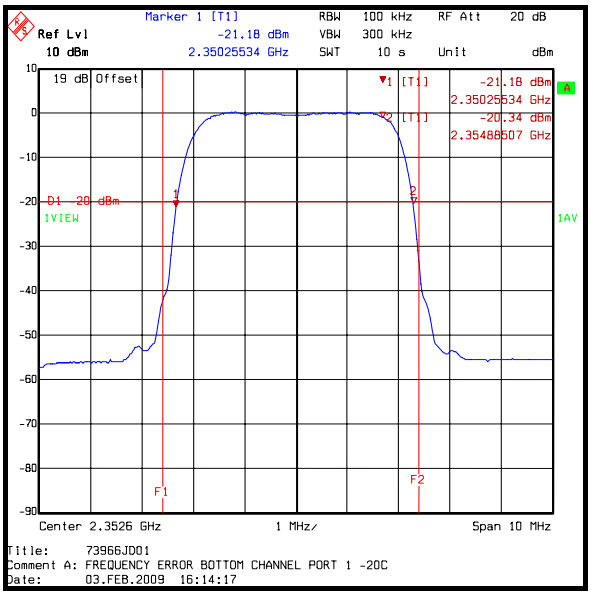
Block A maximum frequency error is 0.001% of the carrier = 23526 Hz.
Lower limit is 2352.576474 MHz, upper limit is 2352.623526 MHz.

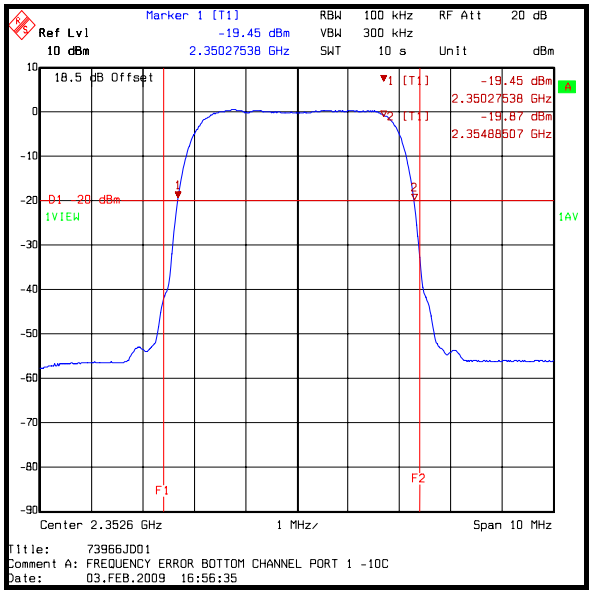
Block B maximum frequency error is 0.001% of the carrier = 23576 Hz.
Lower limit is 2357.576424 MHz, upper limit is 2357.623576 MHz.

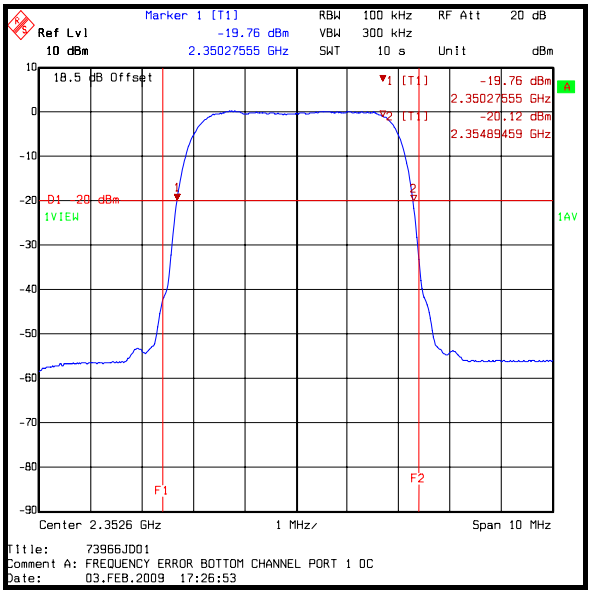
Transmitter Frequency Stability - Temperature Variation (continued)

Bottom channel / Block A / 2350 to 2355 MHz



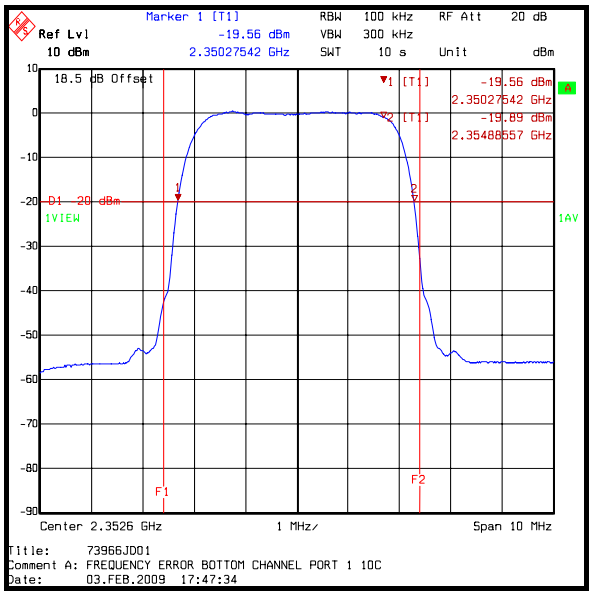


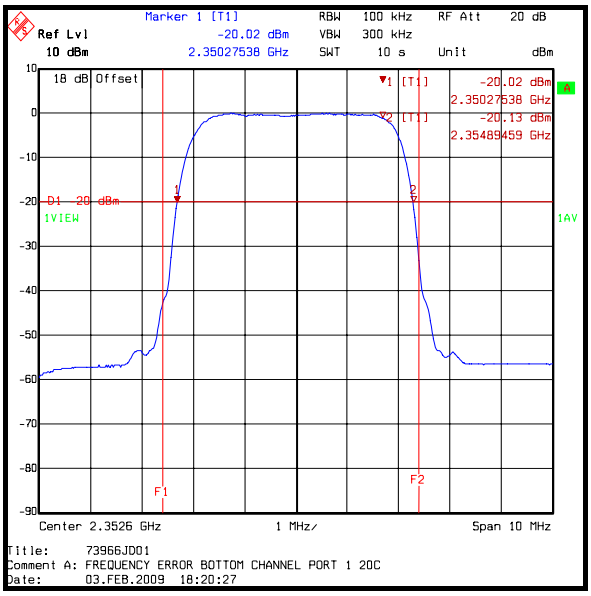


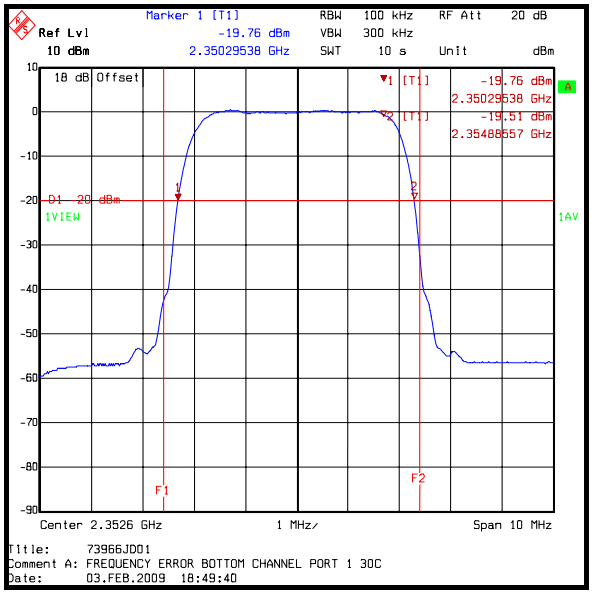


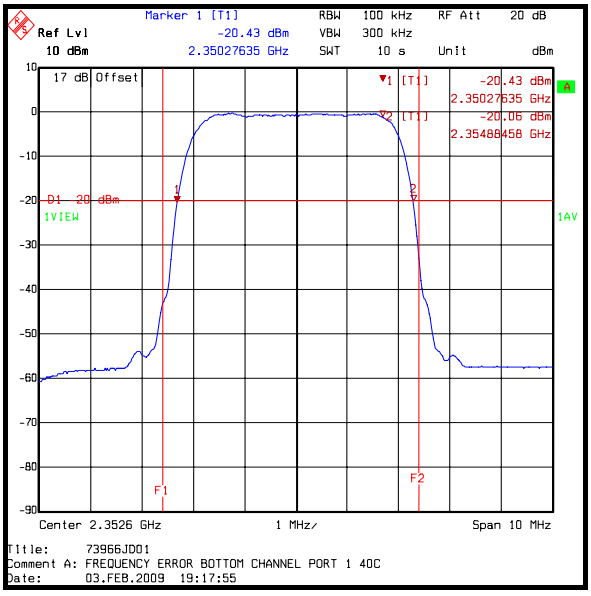
Transmitter Frequency Stability - Temperature Variation (continued)

Bottom channel / Block A / 2350 to 2355 MHz



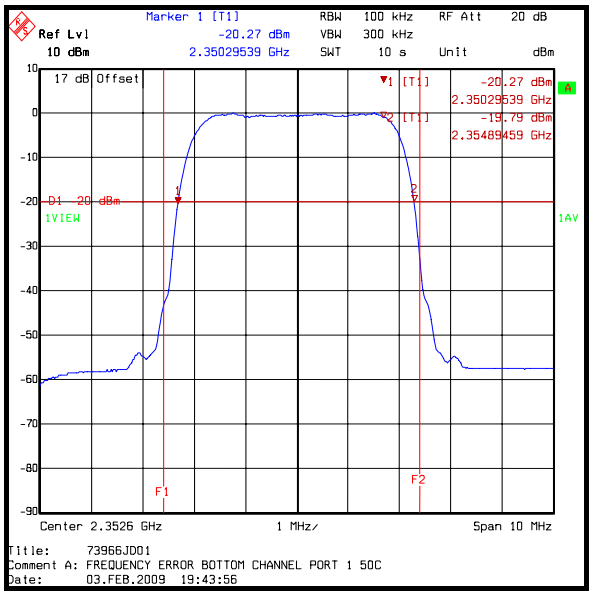






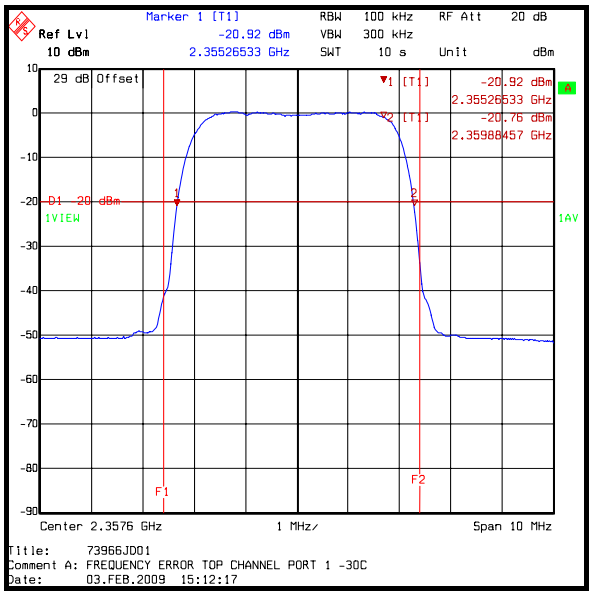
Transmitter Frequency Stability - Temperature Variation (continued)

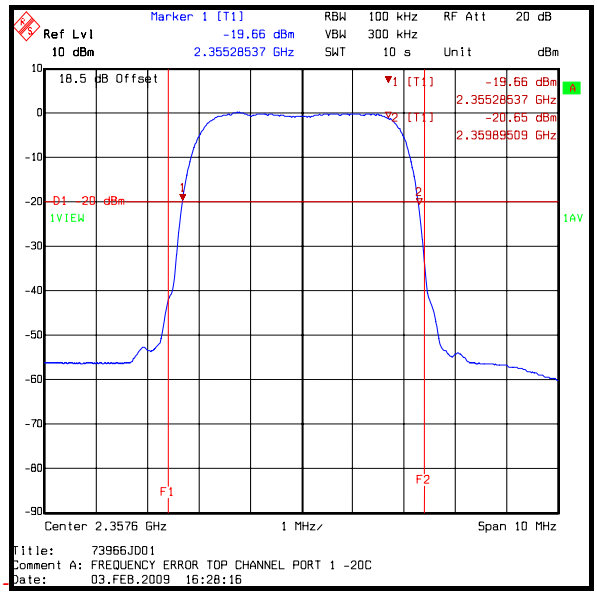
Bottom channel / Block A / 2350 to 2355 MHz

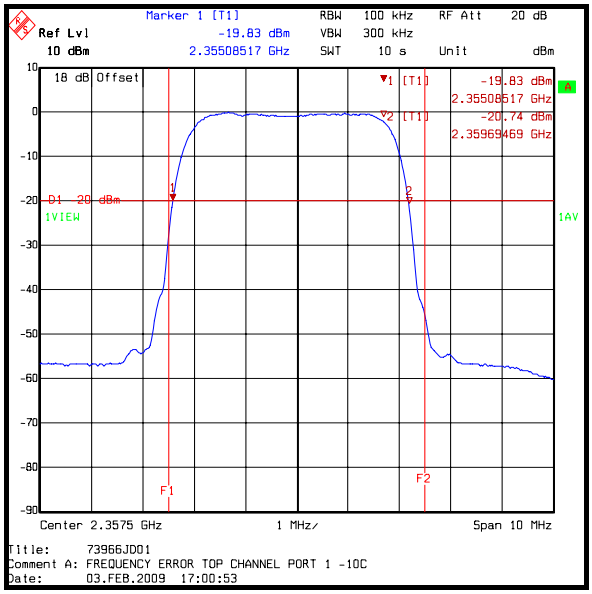


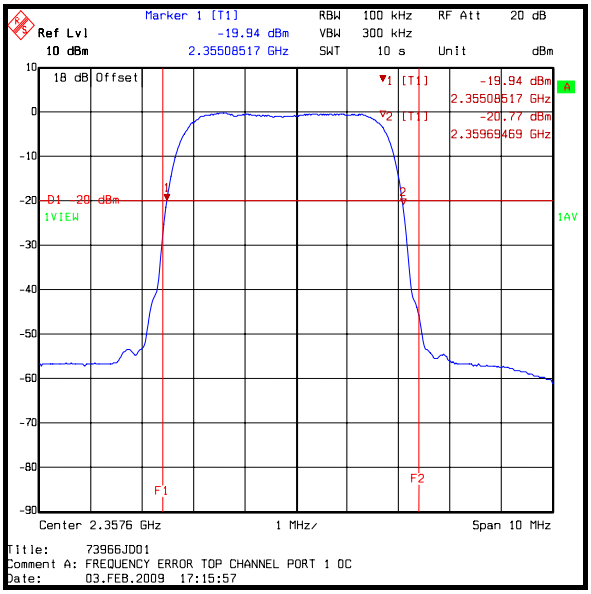
Transmitter Frequency Stability - Temperature Variation (continued)

Top channel / Block B / 2355 to 2360 MHz



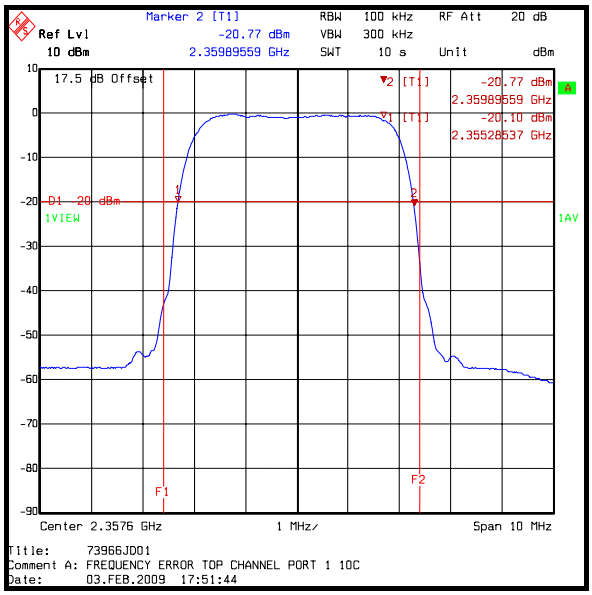


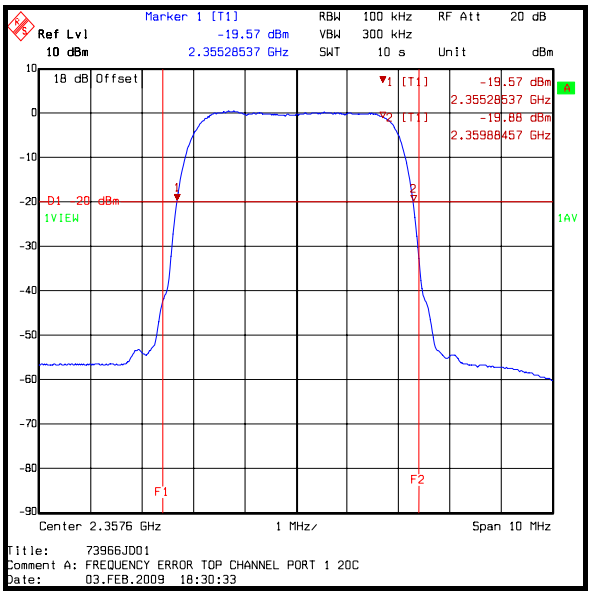


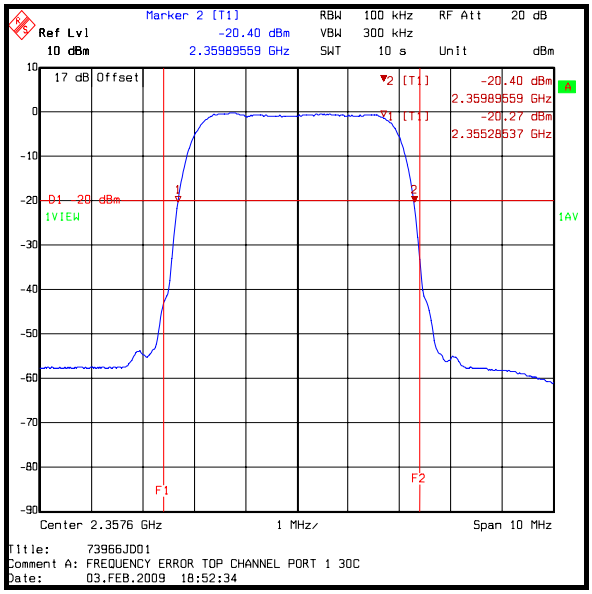


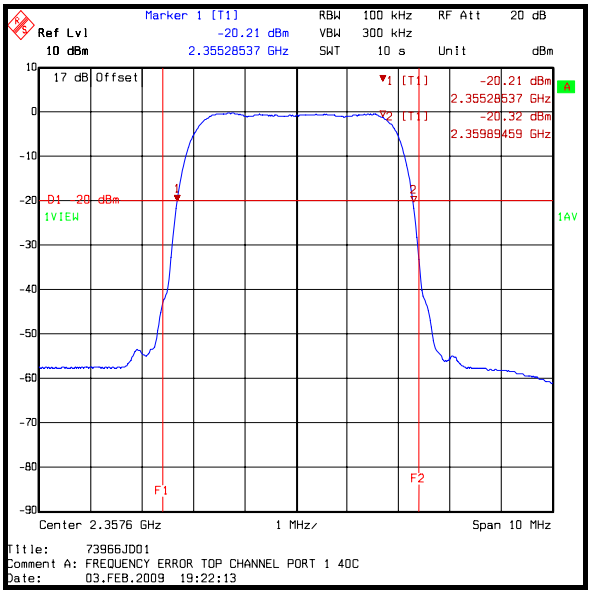
Transmitter Frequency Stability - Temperature Variation (continued)

Top channel / Block B / 2355 to 2360 MHz



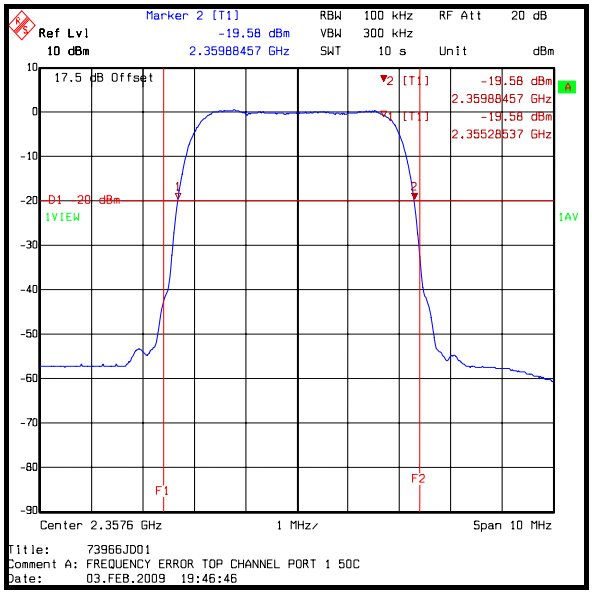






Transmitter Frequency Stability - Temperature Variation (continued)

Top channel / Block B / 2355 to 2360 MHz



Transmitter Frequency Stability - Temperature Variation (continued)

Results: Bottom channel / Block A / Carrier accuracy

Temperature (ºC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
-30	2352.600030	0.0128	2352.576474	2352.623526	Complied
-20	2352.600045	0.0191	2352.576474	2352.623526	Complied
-10	2352.600034	0.0145	2352.576474	2352.623526	Complied
0	2352.600066	0.0281	2352.576474	2352.623526	Complied
10	2352.600066	0.0281	2352.576474	2352.623526	Complied
20	2352.600026	0.0111	2352.576474	2352.623526	Complied
30	2352.599994	0.0026	2352.576474	2352.623526	Complied
40	2352.600014	0.0060	2352.576474	2352.623526	Complied
50	2352.600062	0.0264	2352.576474	2352.623526	Complied

Transmitter Frequency Stability - Temperature Variation (continued)

Results: Top channel / Block B / Carrier accuracy

Temperature (ºC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
-30	2357.600108	0.0458	2357.576424	2357.623576	Complied
-20	2357.600035	0.0148	2357.576424	2357.623576	Complied
-10	2357.600034	0.0144	2357.576424	2357.623576	Complied
0	2357.600051	0.0216	2357.576424	2357.623576	Complied
10	2357.600054	0.0229	2357.576424	2357.623576	Complied
20	2357.599994	0.0025	2357.576424	2357.623576	Complied
30	2357.600058	0.0246	2357.576424	2357.623576	Complied
40	2357.600046	0.0195	2357.576424	2357.623576	Complied
50	2357.600058	0.0246	2357.576424	2357.623576	Complied

7.4.2. Transmitter Frequency Stability - Voltage Variation

Results: Bottom channel / Block A / 2350 to 2355 MHz / Port 1

Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-40.8	2350.27541	2354.89459	275.41	105.41	Complied
-48	2350.27541	2354.89459	275.41	105.41	Complied
-55.2	2350.27541	2354.89459	275.41	105.41	Complied

Results: Bottom channel / Block A / 2350 to 2355 MHz / Port 2

Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-40.8	2350.27541	2354.89459	275.41	105.41	Complied
-48	2350.27541	2354.89459	275.41	105.41	Complied
-55.2	2350.27541	2354.89459	275.41	105.41	Complied

Transmitter Frequency Stability - Voltage Variation (continued)

Results: Top channel / Block B / 2355 to 2360 MHz / Port 1

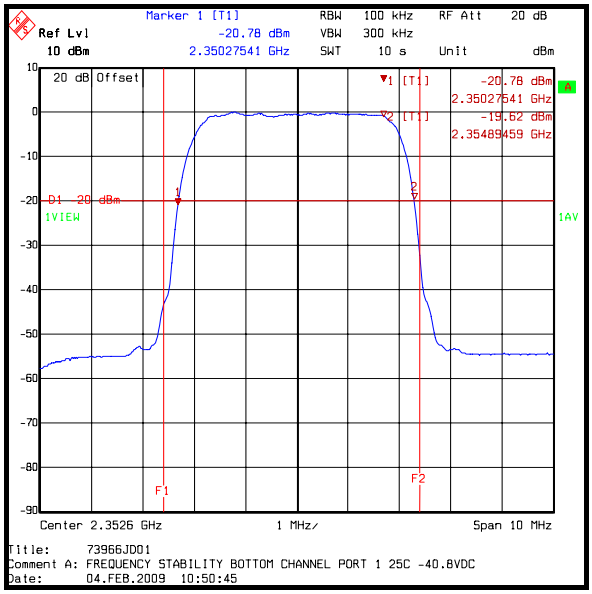
Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-40.8	2355.28537	2359.88457	285.37	115.43	Complied
-48	2355.28537	2359.88457	285.37	115.43	Complied
-55.2	2355.28537	2359.88457	285.37	115.43	Complied

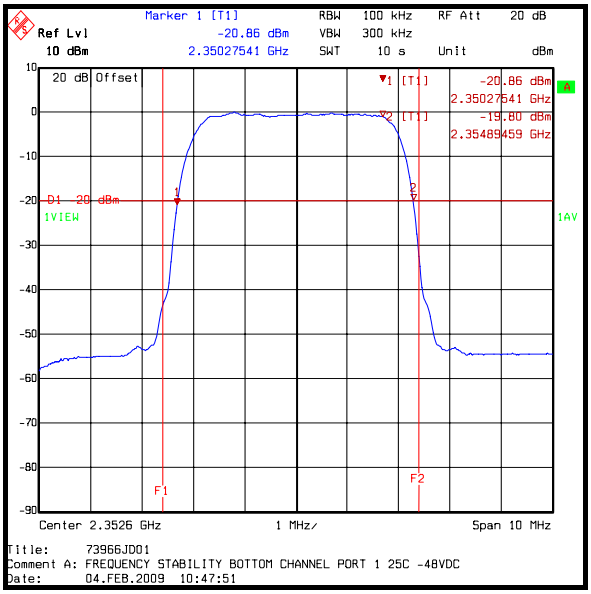
Results: Top channel / Block B / 2355 to 2360 MHz / Port 2

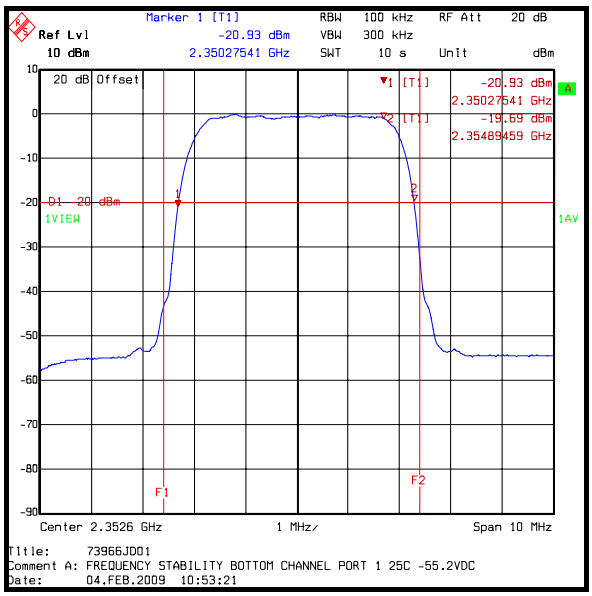
Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-40.8	2355.28537	2359.90461	285.37	95.39	Complied
-48	2355.28537	2359.88457	285.37	115.43	Complied
-55.2	2355.28537	2359.88457	285.37	115.43	Complied

Transmitter Frequency Stability - Voltage Variation (continued)

Bottom channel / Block A / 2350 to 2355 MHz / Port 1

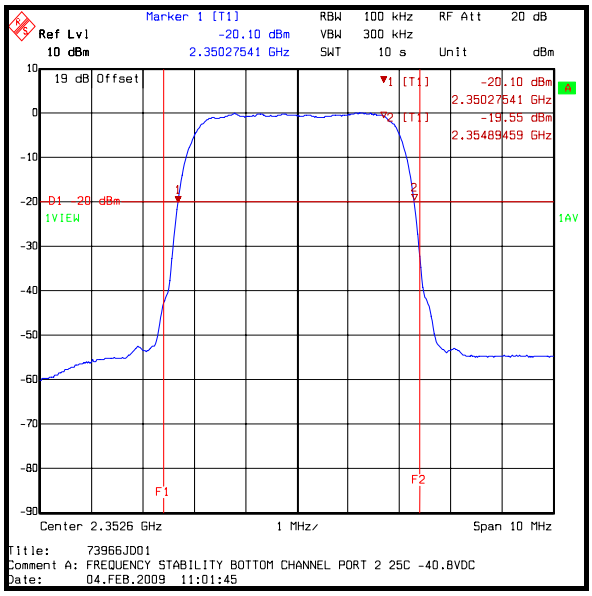


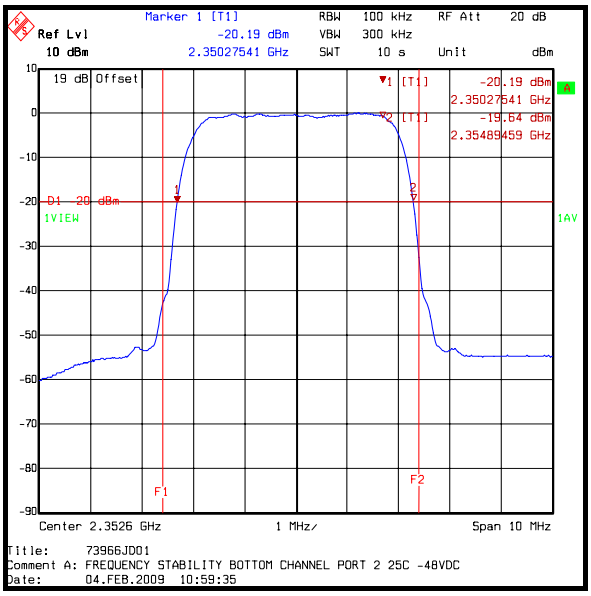


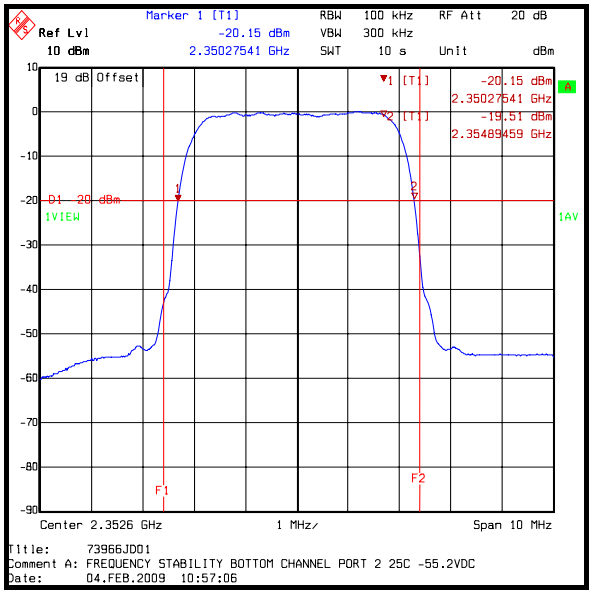


Transmitter Frequency Stability - Voltage Variation (continued)

Bottom channel / Block A / 2350 to 2355 MHz / Port 2

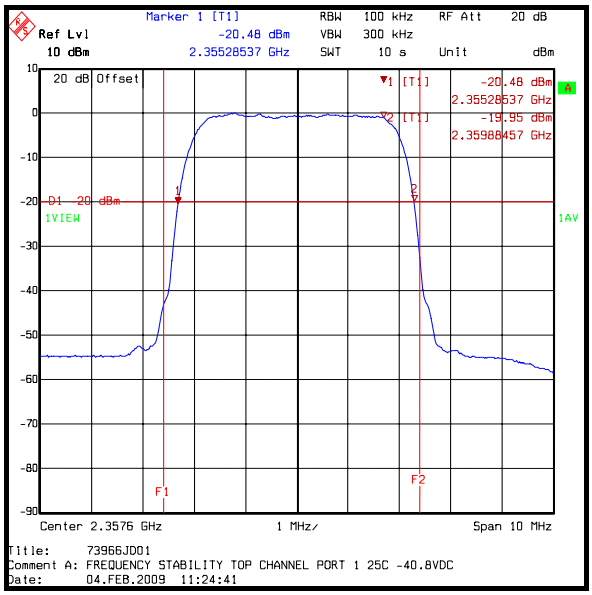


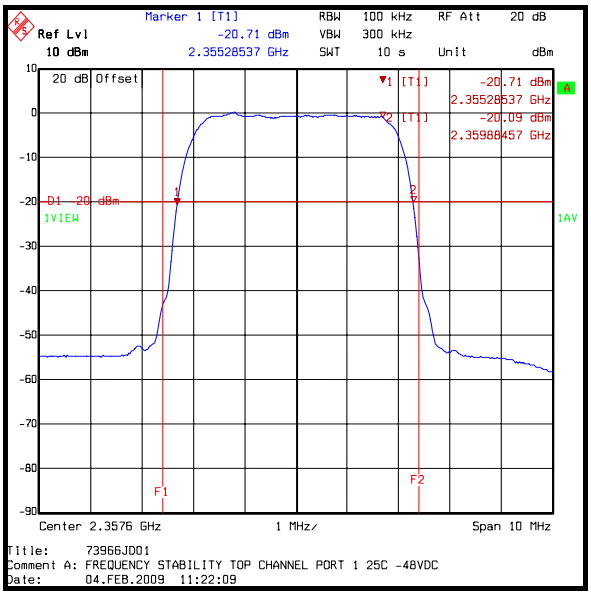


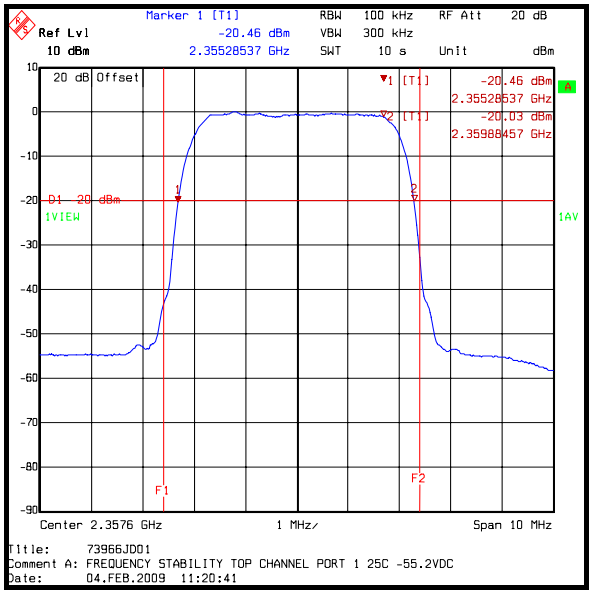


Transmitter Frequency Stability - Voltage Variation (continued)

Top channel / Block B / 2355 to 2360 MHz / Port 1

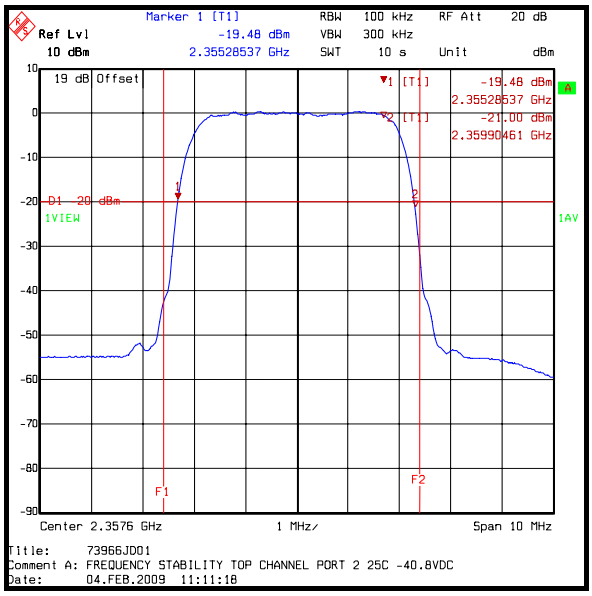


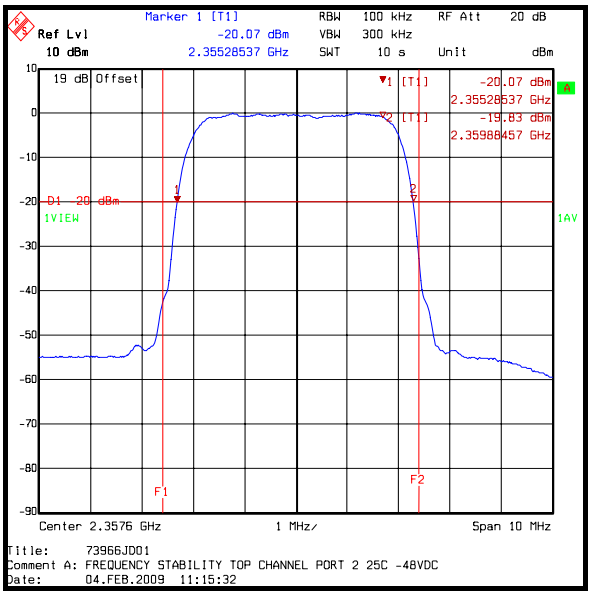


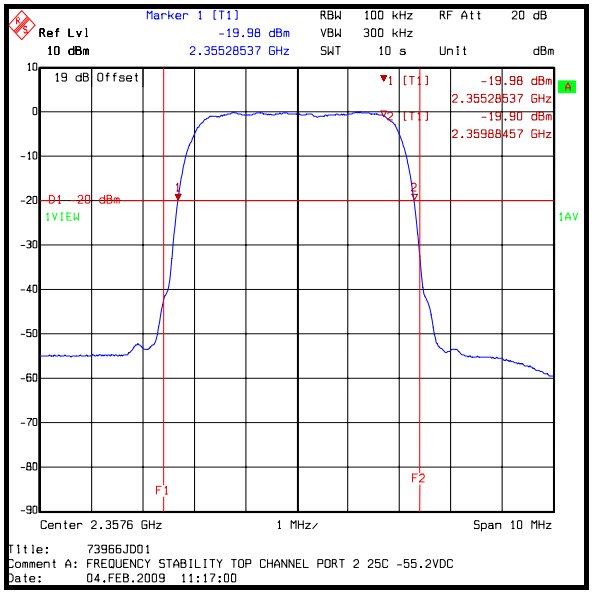


Transmitter Frequency Stability - Voltage Variation (continued)

Top channel / Block B / 2355 to 2360 MHz/ Port 2







Transmitter Frequency Stability - Voltage Variation (continued)

Results: Bottom channel / Block A / Carrier accuracy

Supply voltage (VDC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
-40.8	2352.600026	0.0111	2352.576474	2352.623526	Complied
-48	2352.600026	0.0111	2352.576474	2352.623526	Complied
-55.2	2352.600026	0.0111	2352.576474	2352.623526	Complied

Results: Top channel / Block B / Carrier accuracy

Supply voltage (VDC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
-40.8	2357.600062	0.0263	2357.576424	2357.623576	Complied
-48	2357.600038	0.0161	2357.576424	2357.623576	Complied
-55.2	2357.600058	0.0246	2357.576424	2357.623576	Complied

7.5. Transmitter Conducted Emissions

Test Summary:

FCC Part:	2.1051 and 27.53(a)(1), 27.53(a)(3), 27.53(a)(4)

Environmental Conditions:

Temperature Variation (°C):	23 to 24
Relative Humidity Variation (%):	22 to 24

Note(s):

1. The EUT was configured to transmit at maximum power on bottom and top channels.
2. Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.
3. Preliminary measurements were performed on the top channel, port 1 in the frequency ranges 9 kHz to 2.3 GHz and 2.37 GHz to 26.5 GHz. Final measurements were made on both channels and both ports.
4. Measurements were performed on both channels and both ports in the frequency range 2.3 GHz to 2.37 GHz.

Limits:

Frequency Range	Applicable limit	Limit (dBm)
9 kHz to 2300 MHz	70 + 10 log (P)	-40
2300 MHz to 2320 MHz	43 + 10 log (P)	-13
2320 MHz to 2345 MHz	80 + 10 log (P)	-50
2345 MHz to 2370 MHz	43 + 10 log (P)	-13
2370 MHz to 26.5 GHz	70 + 10 log (P)	-40

7.6. Transmitter Conducted Emissions

Test Summary:

FCC Part:	2.1051 and 27.53(a)(3)
Frequency Range(s)	9 kHz to 2.3 GHz 2.37 GHz to 26.5 GHz

Environmental Conditions:

Temperature Variation (°C):	25 to 26
Relative Humidity Variation (%):	23 to 32

Results: Bottom channel / Block A / Port 1

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
0000.010	-52.9	-40.0	12.9	Complied
4706.984	-48.9	-40.0	8.9	Complied

Results: Top channel / Block B / Port 1

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
0000.010	-52.9	-40.0	12.9	Complied
4716.964	-54.4	-40.0	14.4	Complied

Results: Bottom channel / Block A / Port 2

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
0000.010	-52.9	-40.0	12.9	Complied
4703.436	-56.1	-40.0	16.1	Complied

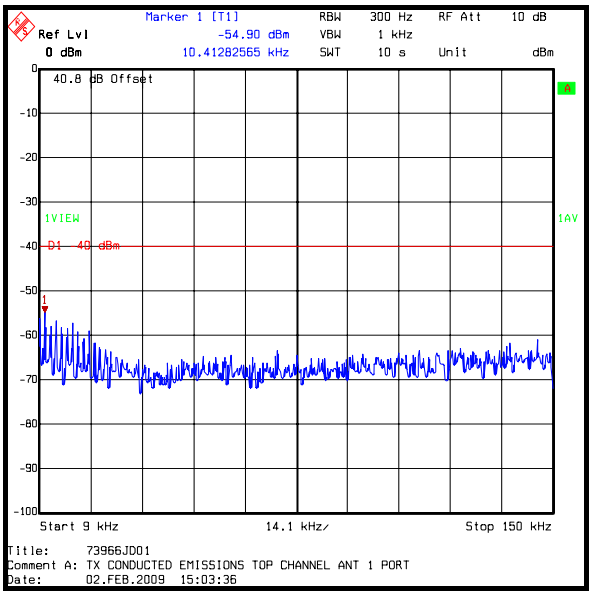
Results: Top channel / Block B / Port 2

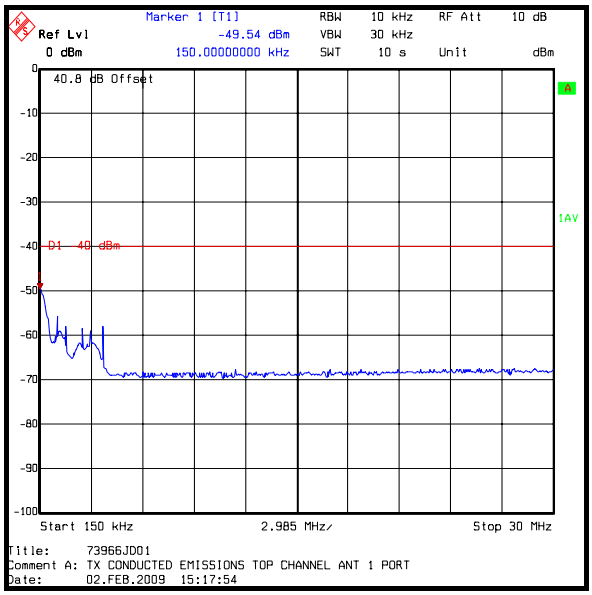
Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
0000.010	-52.9	-40.0	12.9	Complied
4713.357	-55.2	-40.0	15.2	Complied

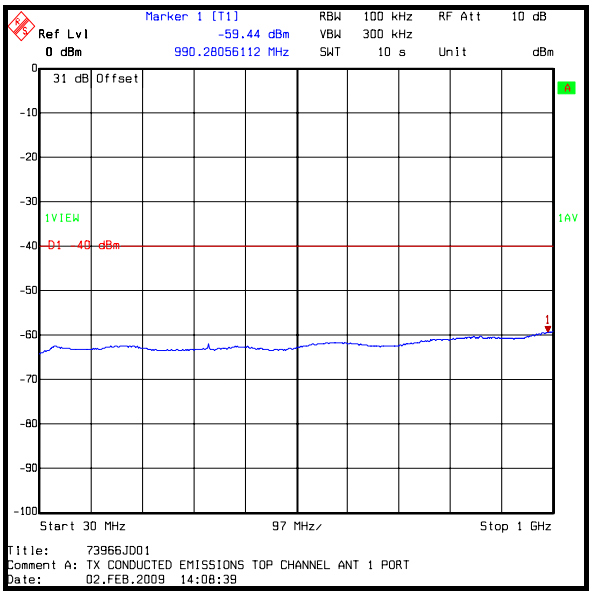
Note(s):

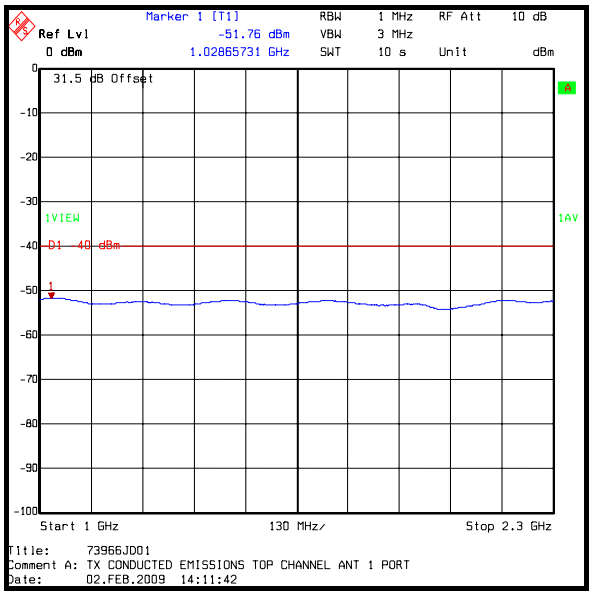
1. All other emissions were >20 dB below the applicable limit or below the level of the noise floor of the measuring receiver.

Transmitter Conducted Emissions (continued)

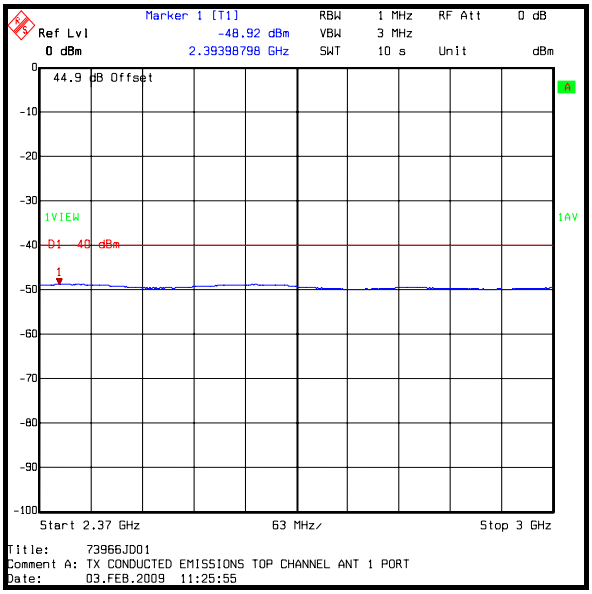


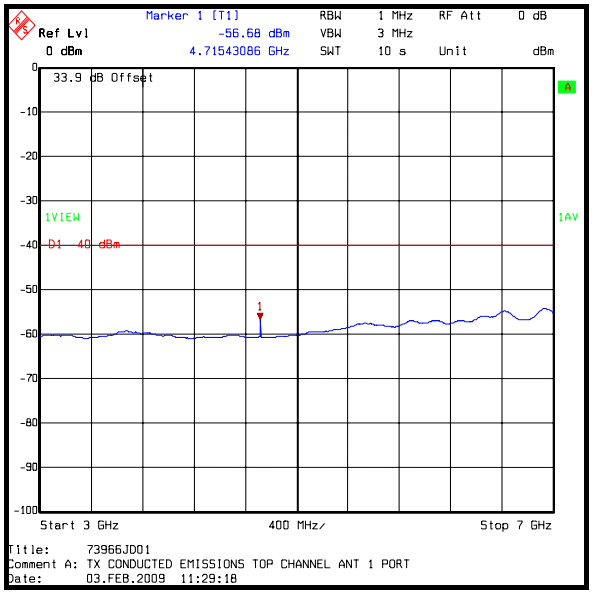


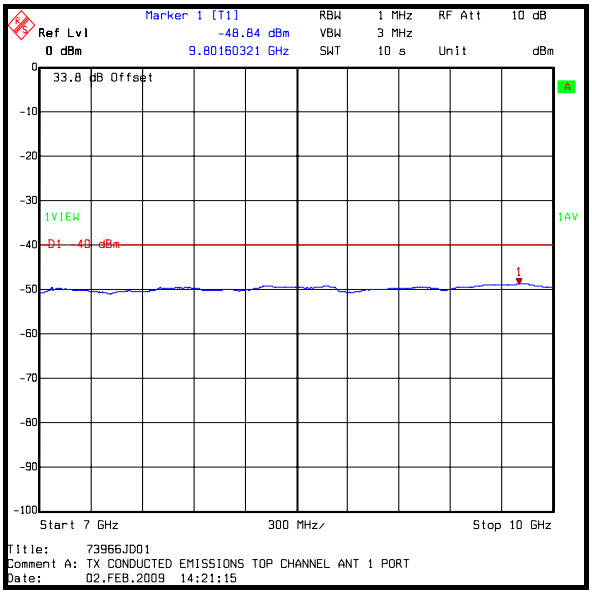


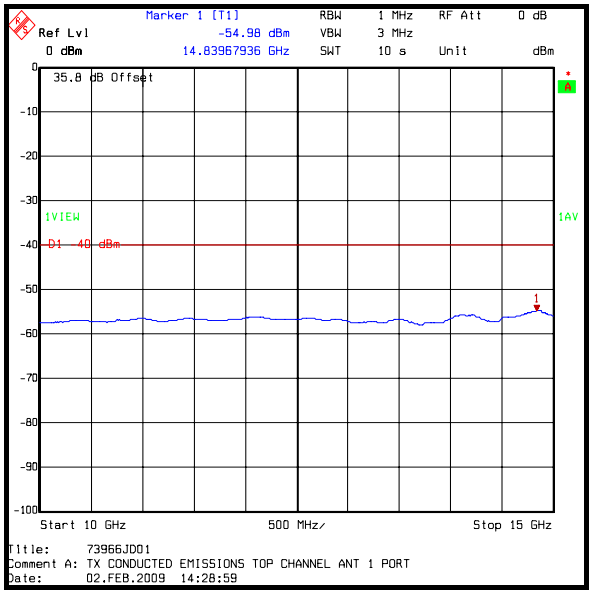


Transmitter Conducted Emissions (continued)

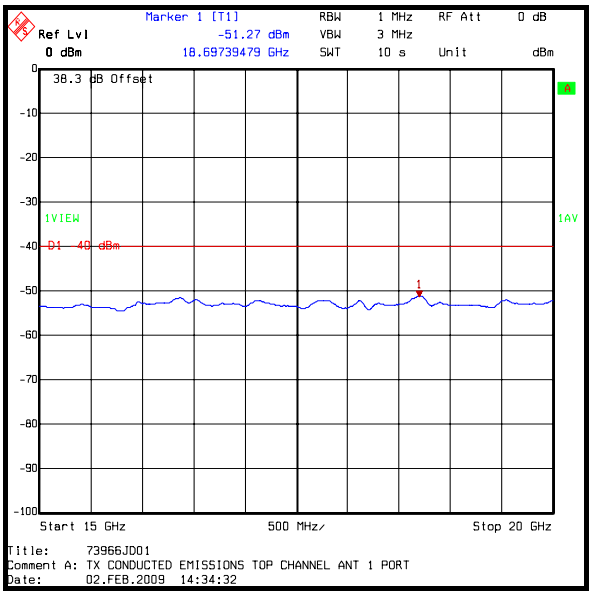


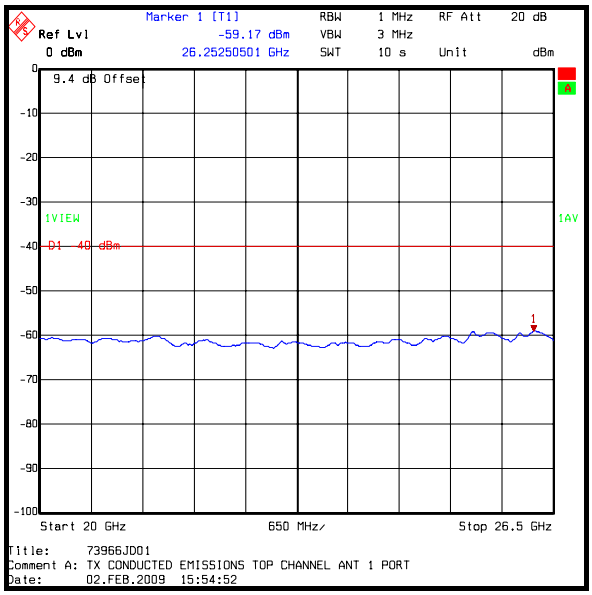






Transmitter Conducted Emissions: Part 2.1051 & Part 27.53 (continued)





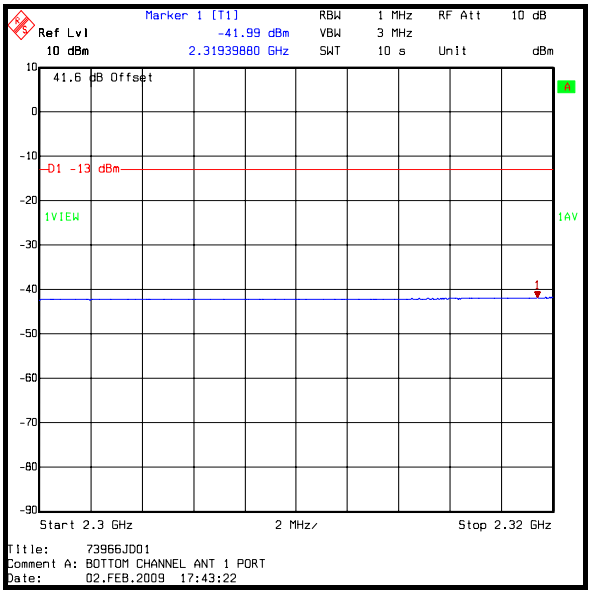
Transmitter Conducted Emissions – Band Edge

Results: Bottom channel / Block A / Transmit Frequency 2352.6 MHz

Conducted spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block A (2350-2355 MHz) in accordance with Part 27.53(a)(3).

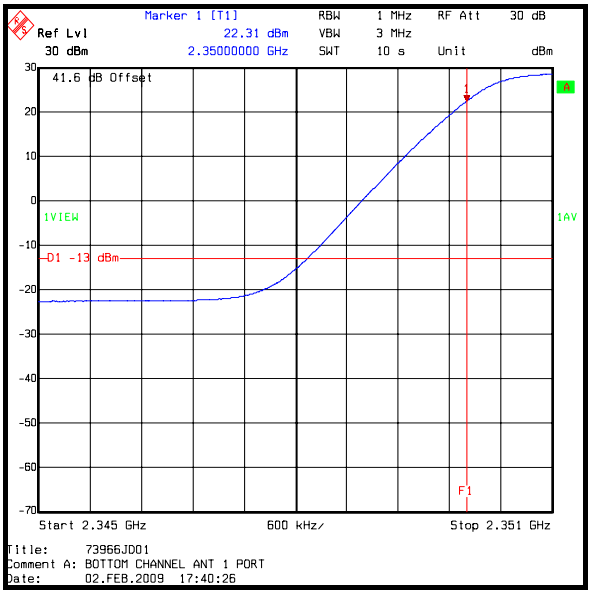
Port	Frequency of 1 MHz strip adjacent to block edge	Level in 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
1	2349.5	-19.2	-13.0	6.2	Complied
1	2355.5	-15.0	-13.0	2.0	Complied
2	2349.5	-21.7	-13.0	8.7	Complied
2	2355.5	-15.3	-13.0	2.2	Complied

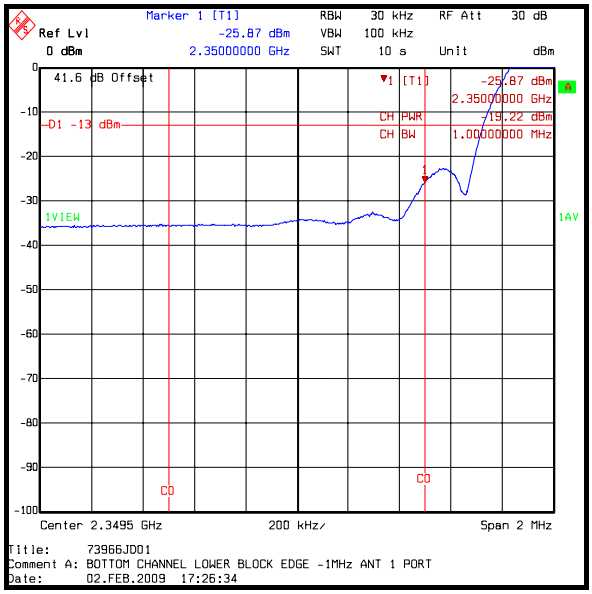
Bottom channel / Block A / 2352.6 MHz / Port 1

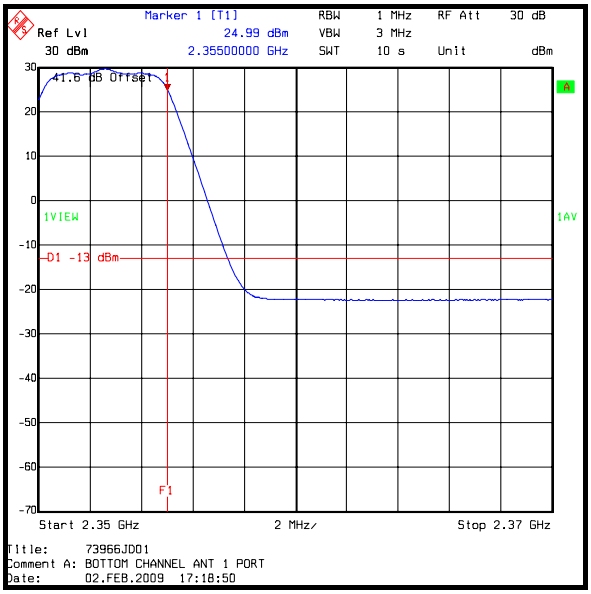


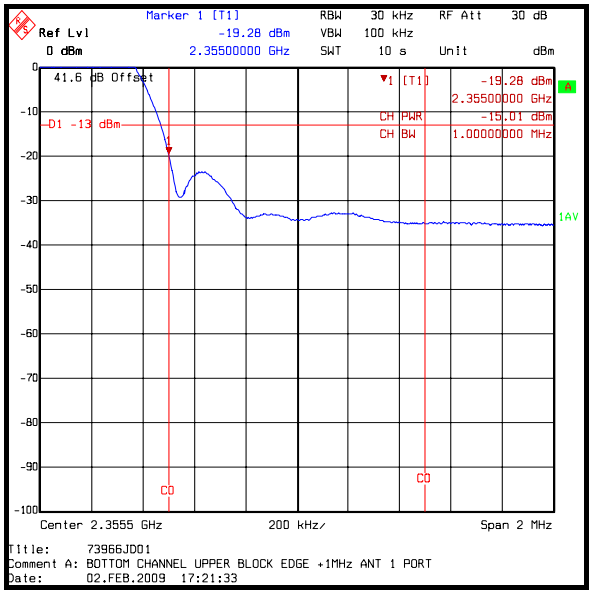
Transmitter Conducted Emissions – Band Edge (continued)

Bottom channel / Block A / 2352.6 MHz / Port 1



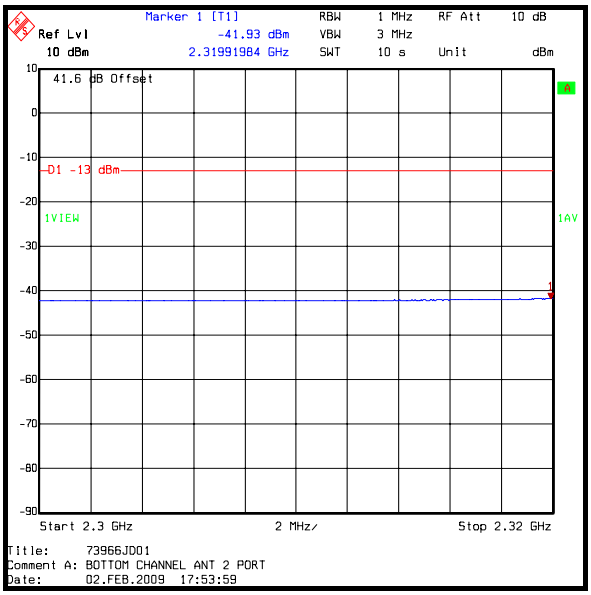






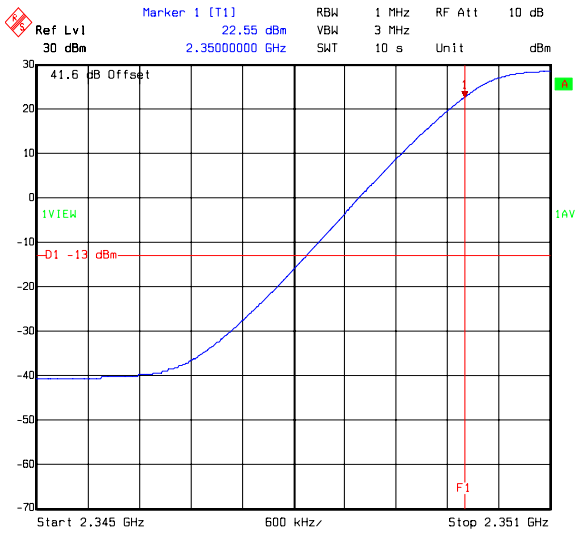
Transmitter Conducted Emissions – Band Edge (continued)

Bottom channel / Block A / 2352.6 MHz / Port 2

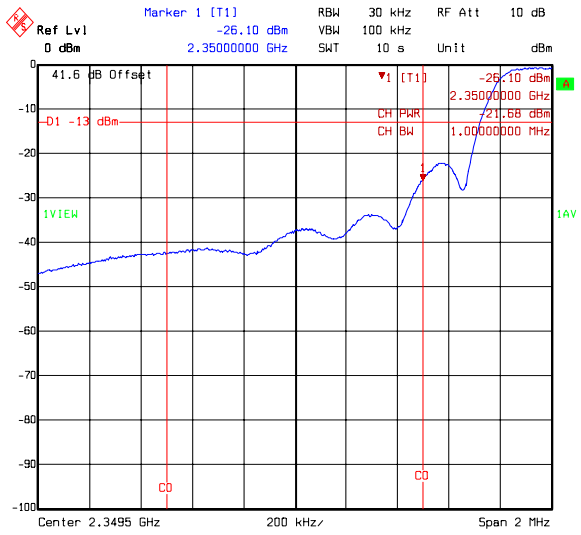


Transmitter Conducted Emissions – Band Edge (continued)

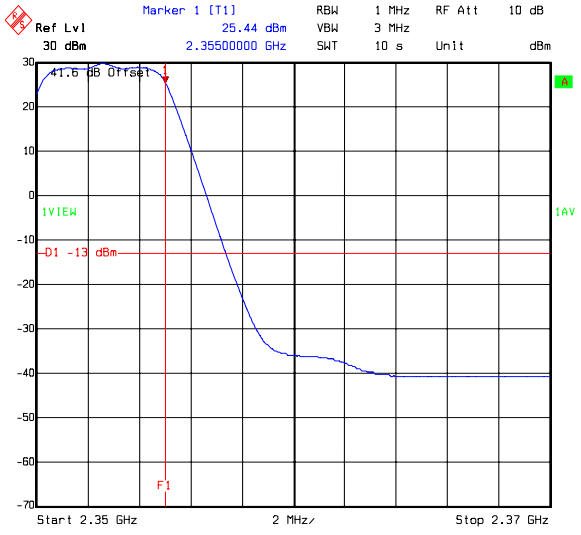
Bottom channel /Block A / 2352.6 MHz / Port 2



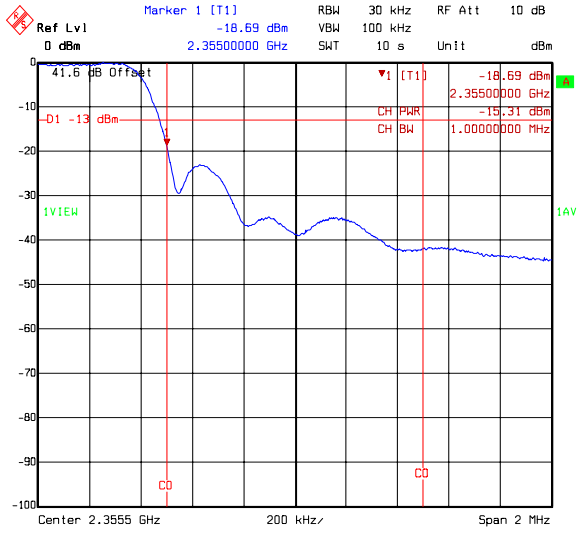
Title: 73966JD01
Comment A: BOTTOM CHANNEL ANT 2 PORT
Date: 02.FEB.2009 17:56:55



Title: 73966JD01
Comment A: BOTTOM CHANNEL LOWER BLOCK EDGE -1MHz ANT 2 PORT
Date: 02.FEB.2009 18:03:35



Title: 73966JD01
Comment A: BOTTOM CHANNEL ANT 2 PORT
Date: 02.FEB.2009 17:58:34



Title: 73966JD01
Comment A: BOTTOM CHANNEL UPPER BLOCK EDGE +1MHz ANT 2 PORT
Date: 02.FEB.2009 18:00:36

Transmitter Conducted Emissions – Band Edge (continued)

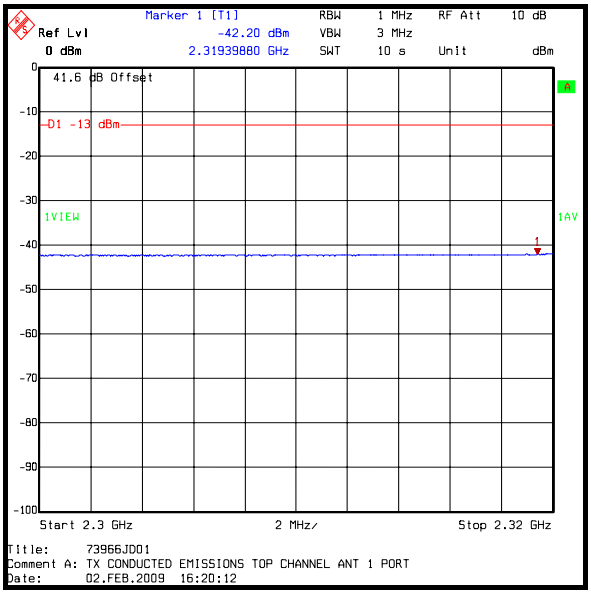
Results: Top channel / Block B / Transmit Frequency 2357.6 MHz

Conducted spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block B (2355-2360 MHz) in accordance with Part 27.53(a)(3).

Port	Frequency of 1 MHz strip adjacent to block edge	Level in 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
1	2354.5	-21.7	-13.0	8.7	Complied
1	2360.5	-15.7	-13.0	2.7	Complied
2	2354.5	-21.1	-13.0	8.1	Complied
2	2360.5	-15.5	-13.0	2.5	Complied

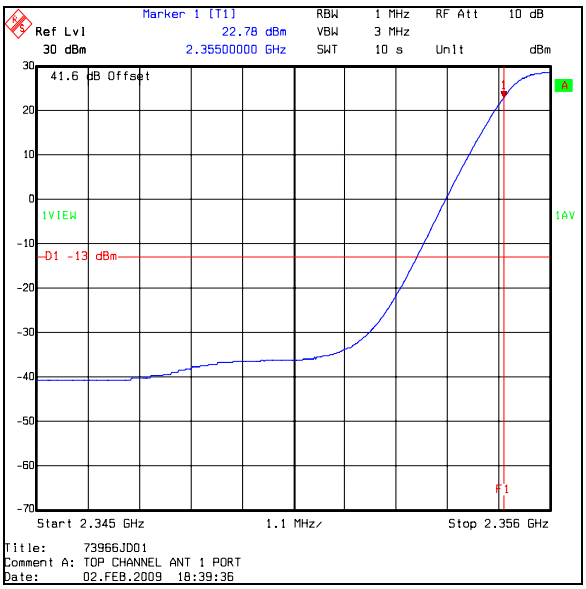
Transmitter Conducted Emissions - Band Edge (continued)

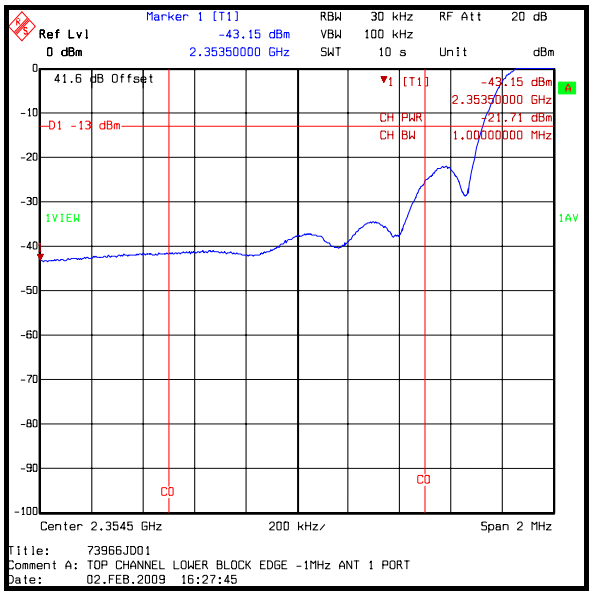
Top channel / Block B / 2357.6 MHz / Port 1

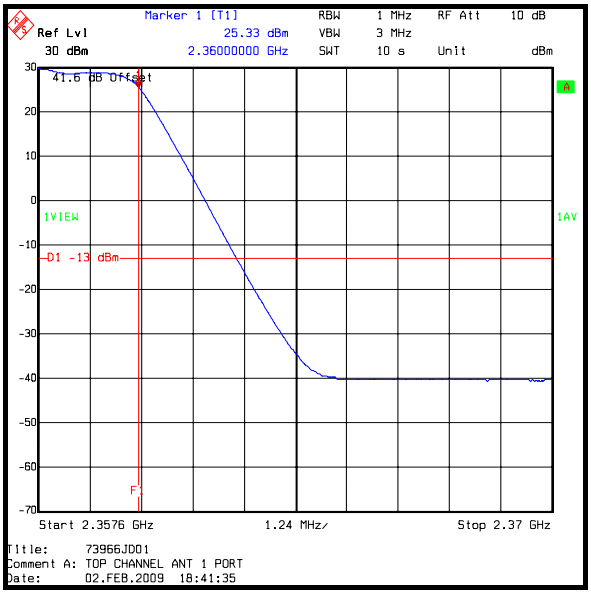


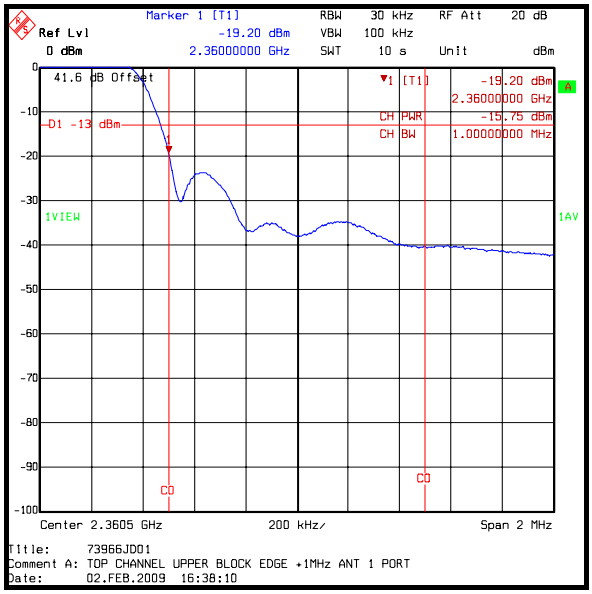
Transmitter Conducted Emissions - Band Edge (continued)

Top channel / Block B / 2357.6 MHz / Port 1



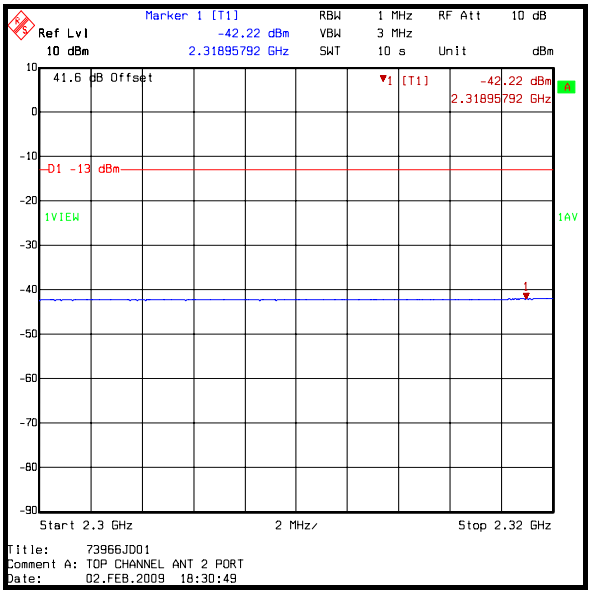






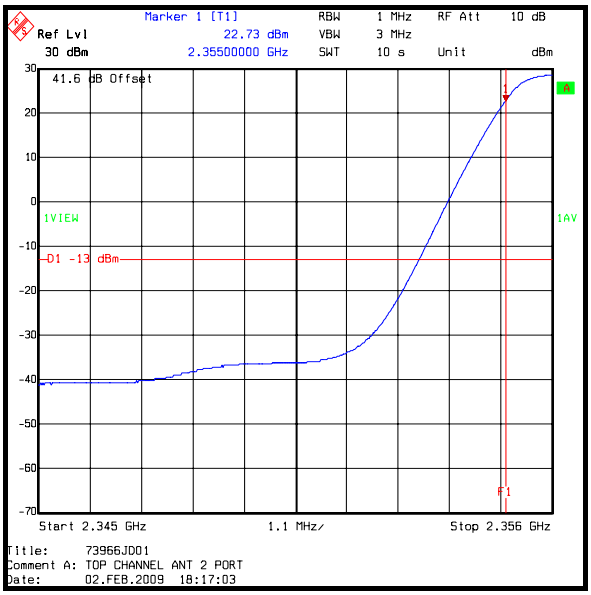
Transmitter Conducted Emissions – Band Edge (continued)

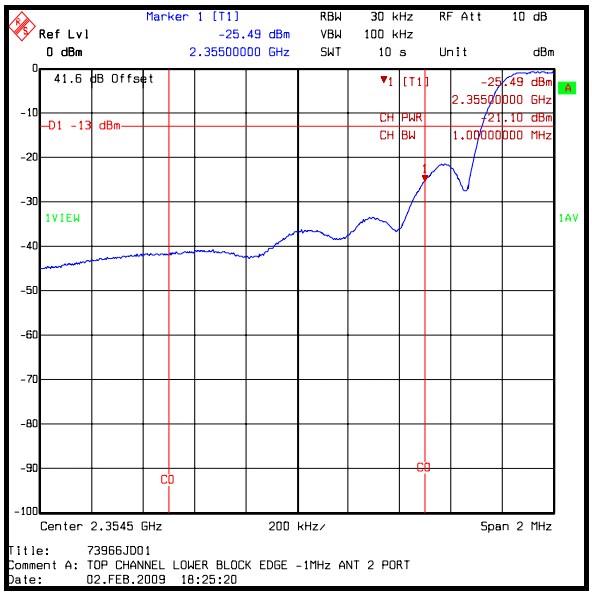
Top channel / Block B / 2357.6 MHz / Port 2

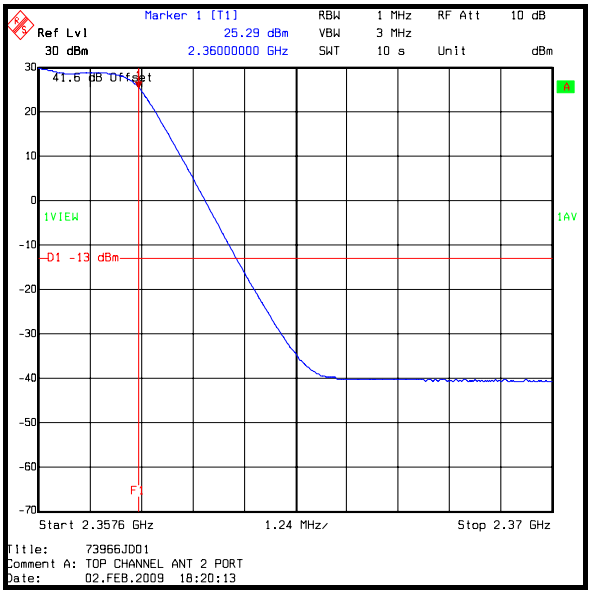


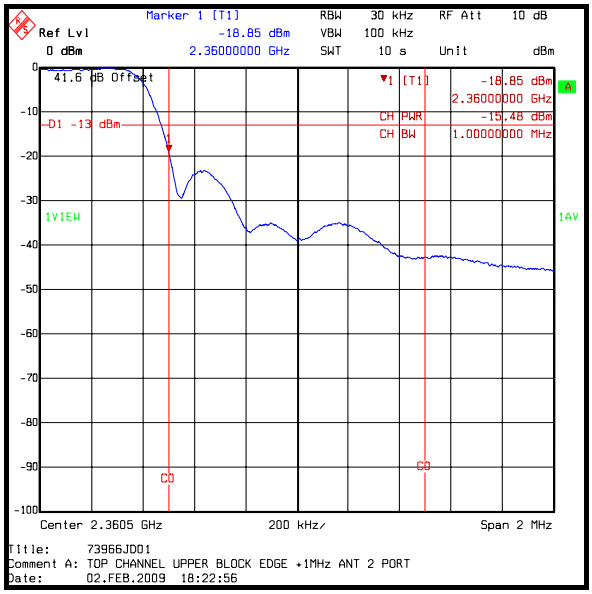
Transmitter Conducted Emissions – Band Edge (continued)

Top channel / Block B / 2357.6 MHz / Port 2









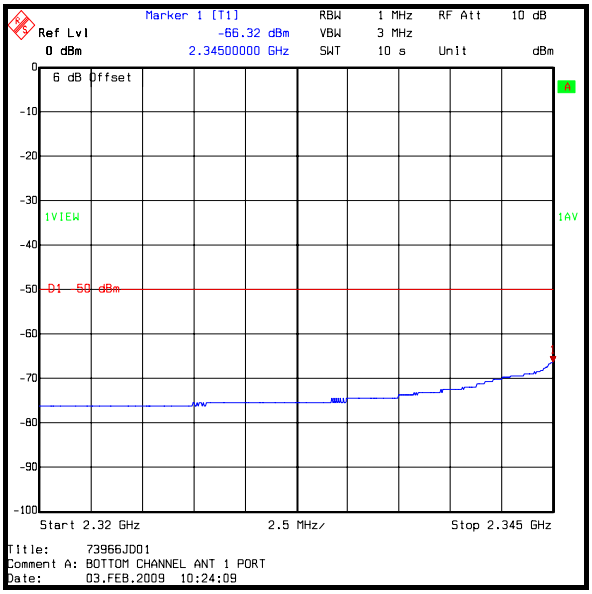
Transmitter Conducted Emissions – Band Edge (continued)

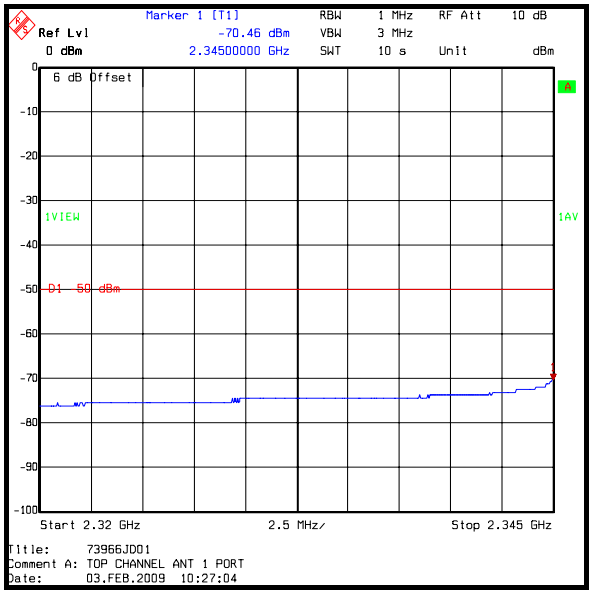
Conducted spurious emission measurements in the frequency ranges 2320-2345 MHz in accordance with Part 27.53(a)(1).

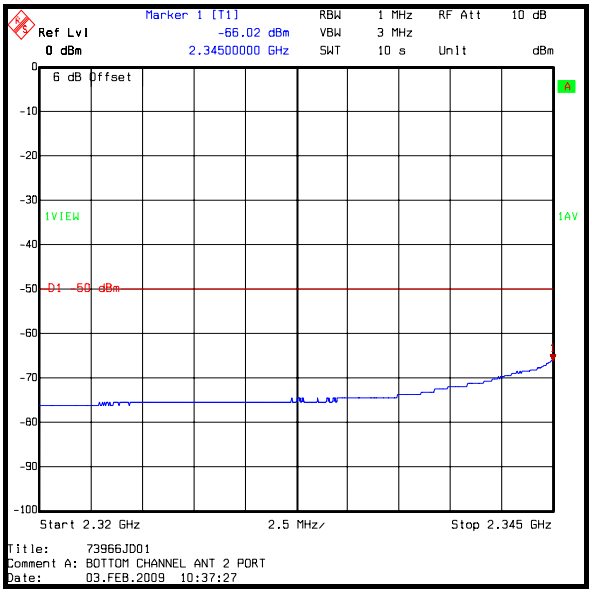
Port	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1	2345.000	-66.3	-50.0	16.3	Complied
1	2345.000	-70.5	-50.0	20.5	Complied
2	2345.000	-66.0	-50.0	16.0	Complied
2	2345.000	-71.0	-50.0	21.0	Complied

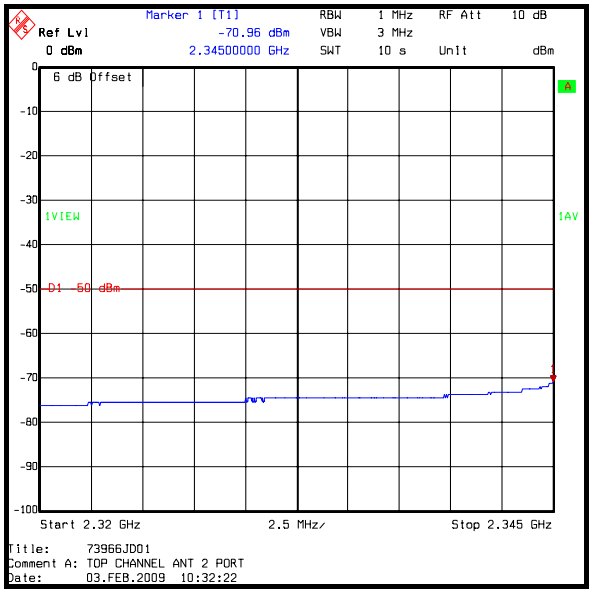
Transmitter Conducted Emissions – Band Edge (continued)

Additional Bottom Block Edge requirement.









7.7. Transmitter Radiated Emissions

Test Summary:

FCC Part:	2.1051 and 27.53(a) (1), 27.53(a)(3), 27.53(a)(4)

Environmental Conditions:

Temperature Variation (°C):	23 to 24
Relative Humidity Variation (%):	22 to 24

Results: Bottom Channel

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
875.010	-52.3	-40.0	12.3	Complied
1500.000	-49.8	-40.0	9.8	Complied
1663.530	-42.5	-40.0	2.5	Complied
1833.406	-44.8	-40.0	4.8	Complied
1916.613	-48.9	-40.0	8.9	Complied
4705.300	-48.0	-40.0	8.0	Complied

Results: Top Channel

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
875.010	-51.3	-40.0	11.3	Complied
1500.000	-48.9	-40.0	8.9	Complied
1666.666	-42.6	-40.0	2.6	Complied
1833.406	-47.4	-40.0	7.4	Complied
1916.643	-51.8	-40.0	11.8	Complied
2333.426	-59.0	-50.0	9.0	Complied
4715.327	-53.2	-40.0	13.2	Complied

Note(s):

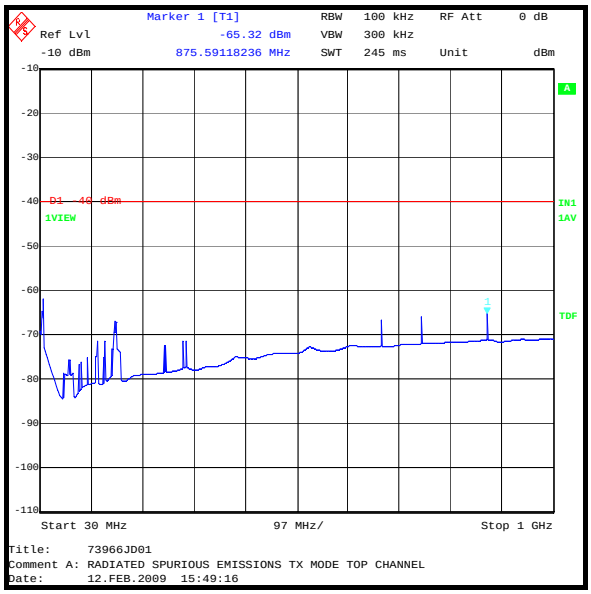
1. Prescans were performed with the EUT transmitting on the top channel, apart from the frequency range 2345MHz to 2370 MHz where the prescan was also performed with the EUT transmitting on the bottom channel. Final measurements were performed on the bottom and top channels.
2. The EUT was configured to transmit at maximum power on bottom and top channels.
3. Measurements were performed with the test system antenna polarised in the vertical and horizontal planes, the highest level was recorded.
4. All other emissions were >20 dB below the applicable limit or below the level of the noise floor.

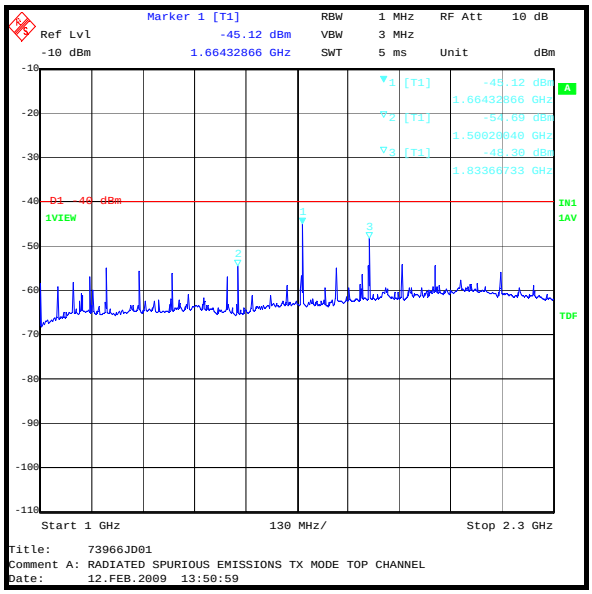
Transmitter Radiated Emissions (continued)

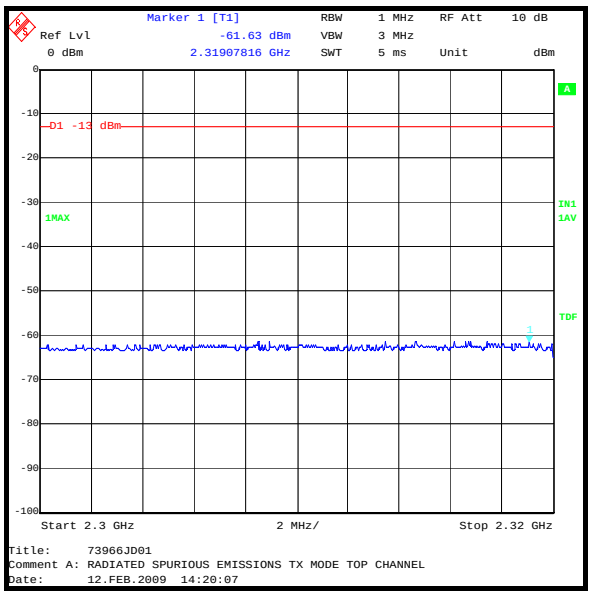
Limits:

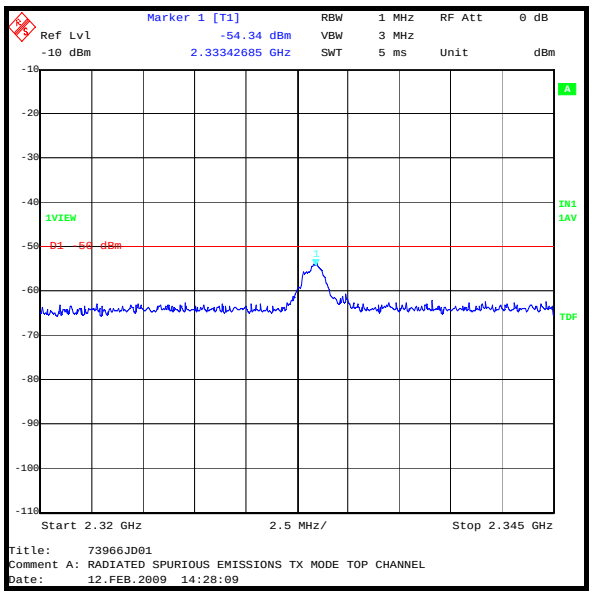
Frequency Range	Applicable limit	Limit (dBm)
9 kHz to 2300 MHz	70 + 10 log (P)	-40
2300 MHz to 2320 MHz	43 + 10 log (P)	-13
2320 MHz to 2345 MHz	80 + 10 log (P)	-50
2345 MHz to 2370 MHz	43 + 10 log (P)	-13
2370 MHz to 26.5 GHz	70 + 10 log (P)	-40

Transmitter Radiated Emissions (continued)

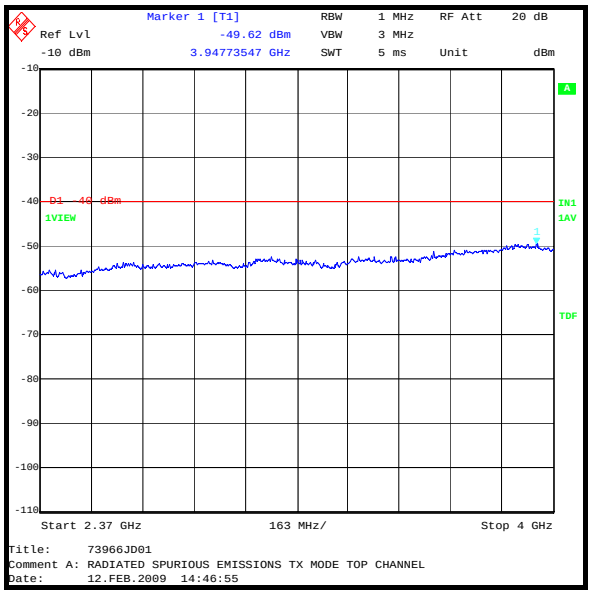


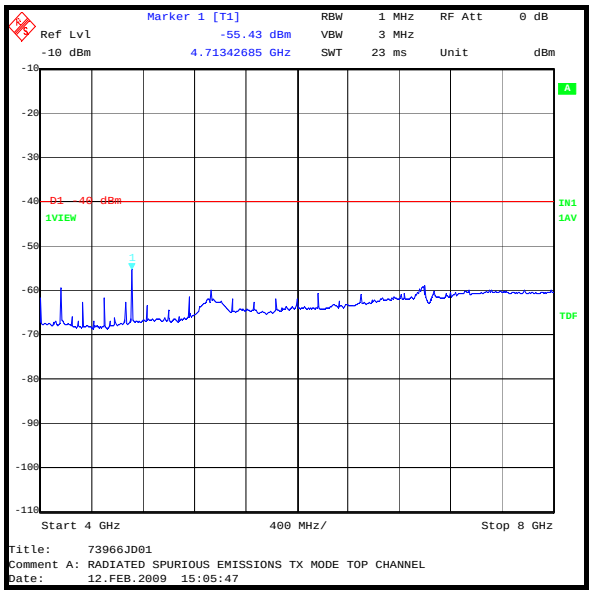


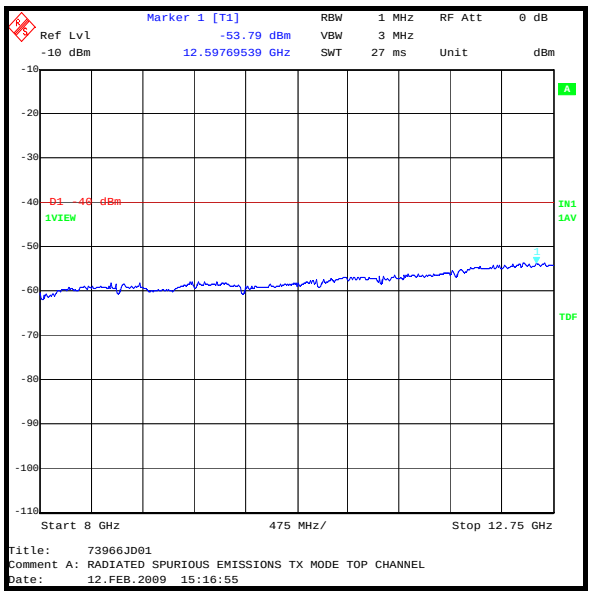


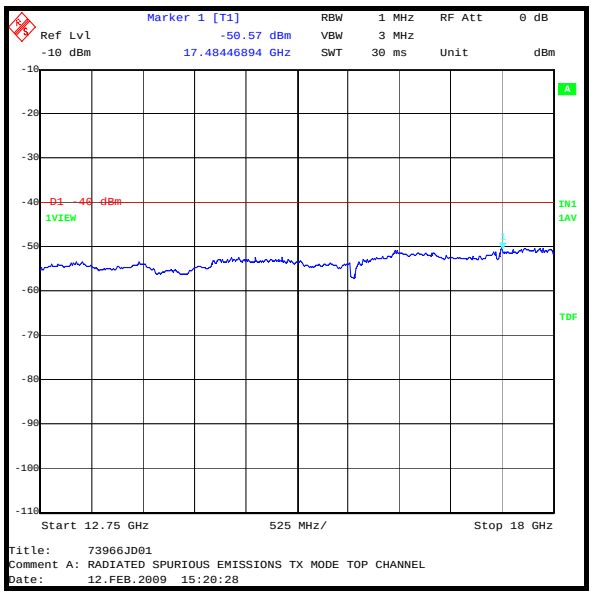


Transmitter Radiated Emissions (continued)

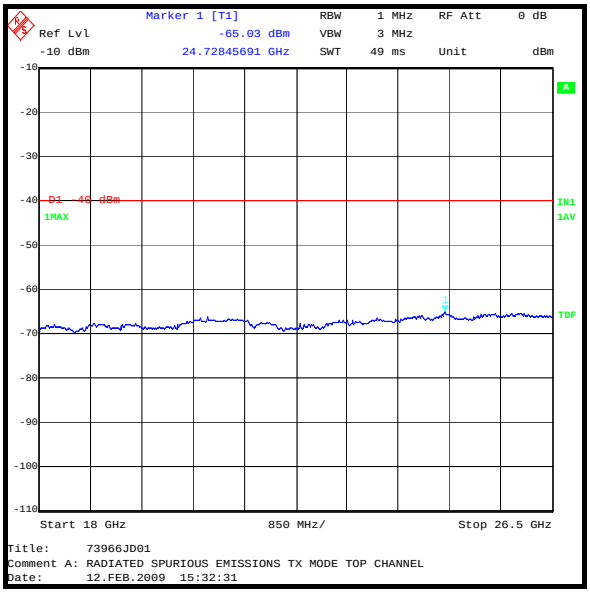








Transmitter Radiated Emissions (continued)



7.8. Transmitter Radiated Emissions – Band Edge

Test Summary:

FCC Part:	2.1051 and 27.53(a) (1), 27.53(a)(3), 27.53(a)(4)

Environmental Conditions:

Temperature Variation (°C):	23 to 24
Relative Humidity Variation (%):	22 to 24

Results: Bottom Channel

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2350.000	-42.7	-13.0	29.7	Complied
2355.090	-40.7	-13.0	27.7	Complied

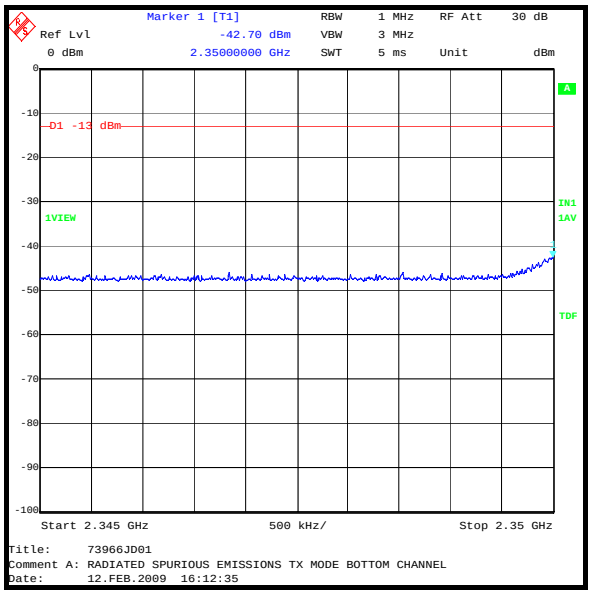
Results: Top Channel

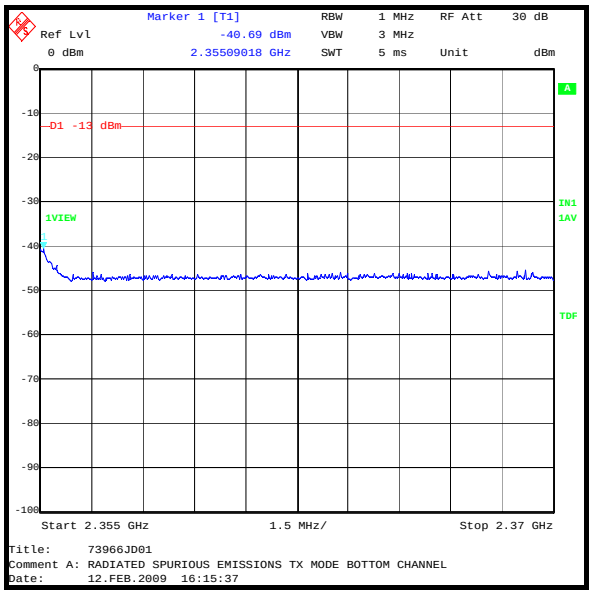
Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2354.979	-40.4	-13.0	27.4	Complied
2360.000	-35.1	-13.0	22.1	Complied

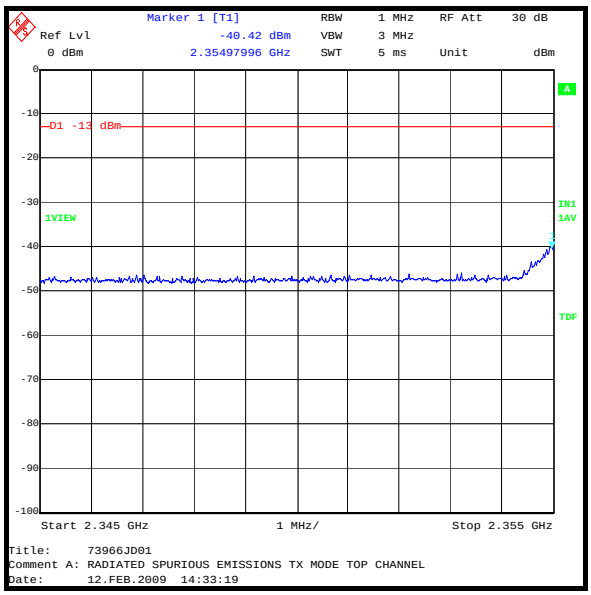
Limits:

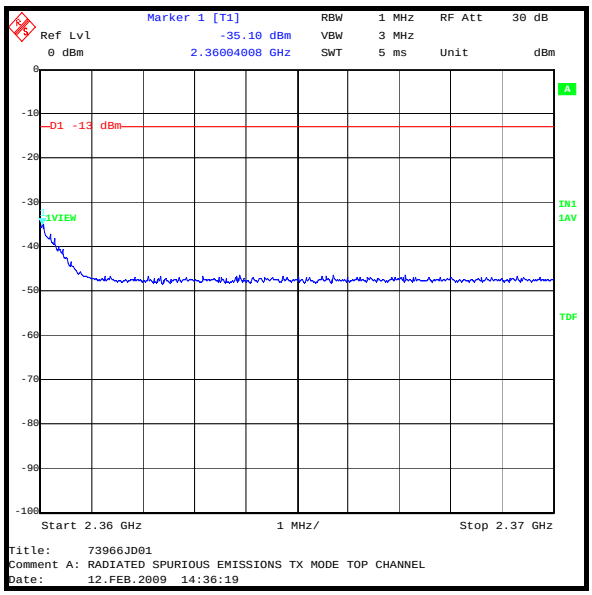
Frequency Range	Applicable limit	Limit (dBm)
9 kHz to 2300 MHz	70 + 10 log (P)	-40
2300 MHz to 2320 MHz	43 + 10 log (P)	-13
2320 MHz to 2345 MHz	80 + 10 log (P)	-50
2345 MHz to 2370 MHz	43 + 10 log (P)	-13
2370 MHz to 26.5 GHz	70 + 10 log (P)	-40

Transmitter Radiated Emissions – Band Edge (continued)









8. 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 30.0 MHz	95%	+/- 3.25 dB
Conducted Carrier Output Power	2350 MHz to 2360 MHz	95%	+/- 1.2 dB
Carrier Output Power (EIRP)	2350 MHz to 2360 MHz	95%	+/- 1.78 dB
Occupied Bandwidth	2350 MHz to 2360 MHz	95%	+/- 0.12%
Conducted Emissions Antenna Port	9 kHz to 26.5 GHz	95%	+/- 1.2 dB
Frequency Stability	2350 MHz to 2360 MHz	95%	+/- 20 Hz

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)
A004	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890604/027	19 May 2008	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1391	Attenuator	HUBER + SUHNER AG	757987	6810.17.B	Calibrated before use	-
A1527	RF Shielded Box	Will tek	4921	LX716066	Calibration not required	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
E0516	Environmental Chamber	TAS	LT1000	23880706	Calibrated before use	-
K0004	Site Reference 4428	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
K0008	Site Reference 4422	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
M1068	Thermometer	Iso-Tech	RS55	93102884	09 Jul 2008	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	19 Feb 2008	12
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	09 Dec 2008	12
M1267	Thermal Power Sensor	Rohde and Schwarz	NRV-Z52	100155	24 Apr 2008	12
M1269	Multimeter	Fluke	179	90250210	09 Apr 2008	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	14 Aug 2008	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	24 Apr 2008	12

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