



TEST REPORT

Test Report No. : UL-RPT-RP10655468JD01A V2.0

Manufacturer : Cambium Networks Ltd
Model No. : PMP 450i / PTP 450i
FCC ID : QWP-50450I
Test Standard(s) : FCC Parts 15.207, 15.209 & 15.247

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 20 May 2015

Checked by:

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Project Lead, Radio Laboratory

Issued by :

pp

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This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its terms of accreditation.

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Table of Contents

1. Customer Information.....	4
2. Summary of Testing.....	5
2.1. General Information	5
2.2. Summary of Test Results	5
2.3. Methods and Procedures	6
2.4. Deviations from the Test Specification	6
3. Equipment Under Test (EUT)	7
3.1. Identification of Equipment Under Test (EUT)	7
3.2. Description of EUT	7
3.3. Modifications Incorporated in the EUT	7
3.4. Additional Information Related to Testing	8
3.5. Support Equipment	9
3.6. Antenna	10
4. Operation and Monitoring of the EUT during Testing	11
4.1. Operating Modes	11
4.2. Configuration and Peripherals	11
5. Measurements, Examinations and Derived Results.....	13
5.1. General Comments	13
5.2. Test Results	14
5.2.1. Transmitter AC Conducted Spurious Emissions	14
5.2.2. Minimum 6 dB Bandwidth	22
5.2.3. Power Spectral Density	29
5.2.4. Maximum Conducted Output Power	36
5.2.5. Band Edge Conducted Emissions	44
5.2.6. Transmitter Radiated Emissions	78
6. Measurement Uncertainty	106
7. Report Revision History	107
Appendix 1. Conducted Test Setup Photograph	108

1. Customer Information









Company Name:	Cambium Networks Ltd
Address:	Unit B2/3, Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Sections 15.207 and 15.209
Site Registration:	209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	23 February 2015 to 10 March 2015

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	
Part 15.247(e)	Transmitter Power Spectral Density	
15.247(b)(3), 15.147(b)(4) & Part 15.247(c)(1)(ii)	Transmitter Conducted Output Power	
Part 15.247(d)/15.209(a)	Transmitter Band Edge Conducted Emissions	
Part 15.247(d)/15.209(a)	Transmitter Radiated Emissions	
Key to Results		
 = Complied  = Did not comply		

2.3. Methods and Procedures

Reference:	ANSI C63.4-2009
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.4-2014
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.10-2009
Title:	American National Standard for Testing Unlicensed Wireless Devices
Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	FCC KDB 558074 D01 v03r02 June 5, 2014
Title:	Guidance for Performing Compliance Measurements on Digital Transmission System (DTS) devices operating Under §15.247
Reference:	FCC KDB 662911 D01 Multiple Transmitter Output v02r01 October 31, 2013
Title:	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
Reference:	FCC KDB 662911 D02 v01, October 25 2011
Title:	MIMO with Cross-Polarized Antennas
Reference:	FCC KDB 174176 D01 Line Conducted FAQ v01, 03/06/2015
Title:	AC power line conducted emissions, frequently asked questions

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:	Cambium Networks Ltd
Model Name or Number:	PMP 450i / PTP 450i
Hardware Version:	ODU: P2 (Mod) Power Injector : Rev 02 Power Over Ethernet: Rev B
Software Version:	B135-PXP455-PRODTEST-2015FEB27
Serial Number:	F50980BB0073
FCC ID:	QWP-50450I

Description:	PoE Power supply
Brand Name:	LEADER ELECTRONICS INC.
Model Name or Number:	NU60-R550111-I3 (Cambium Part No. N000065L001B)
Serial Number:	13000019581409000667

Description:	PoE Power supply
Brand Name:	Cambium Networks
Model Name or Number:	E100109B G
Part Number:	C000065L002B
Serial Number:	1451008904

3.2. Description of EUT

The Equipment Under Test was a point to point transceiver operating in the 5725 MHz to 5850 MHz band. The EUT is available in two configurations:

1. Connectorised with two external antenna ports.
2. Integrated with directional and sectorised flat plate antenna options.

Power is provided by a PoE supply.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:		Digital Transmission System				
Type of Unit:		Microwave fixed radio link transceiver				
Modes/Modulation:		QPSK, 16QAM, 64QAM, 256QAM				
Intended Operating Environment:		Residential, Commercial and Light Industry				
Data rates:		32.4, 64.6, 97.1 & 129.5 Mbps				
Power Supply Requirement(s):		Nominal	PoE supply input 120 VAC 60 Hz PoE output 48 VDC			
Maximum Conducted Output Power:		27.6 dBm				
Frequency Range:		5725 MHz to 5850 MHz				
Channels Tested:	Channel Bandwidth (MHz)	Bottom Channel Frequency (MHz)	Lowest Full Pwr. Channel (MHz)	Middle Channel Frequency (MHz)	Highest Full Pwr. Channel (MHz)	Top Channel Frequency (MHz)
	5	5730	5730	5788	5845	5845
	10	5730	5733	5788	5842	5845
	20	5735	5740	5788	5833	5840
	40	5747	5750	5788	5821	5828

Note(s):

The EUT is unable to operate at full power and remain compliant on some lower and higher channels. Power has been reduced on lower and higher channels in some configurations. 'Lowest Full Pwr. Channel' and 'Highest Full Pwr. Channel' in the table above show the lowest and highest channel frequencies that the EUT can operate at full power and remain compliant. All channel frequencies between the 'Lowest Full Pwr. Channel' and 'Highest Full Pwr. Channel' can operate at full power. Power settings used for testing are shown in Section 4.2 of this test report.

3.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	HP
Model Name or Number:	EliteBook 8530W
Serial Number:	2CE00223BK

Description:	Ethernet Hub
Brand Name:	Netgear
Model Name or Number:	GS605
Serial Number:	2N21223M02078

3.6. Antenna

The table below lists the antennas that the manufacturer intends to use with this product when operating in the 5725-5850 MHz band:

Type	Stated Gain (dBi)	Manufacturer	Antenna Name	Used for Testing	Note
Dual polarised plate (Integrated)	23.0	MARS	MA-WA56-DP23	-	1, 3
Dual polarised plate (Integrated)	17.0	Cambium	5093HH	-	1, 3
Dual polarised plate (External)	28.5	MARS	MA-WA56-DP28N	X	2
4 ft Parabolic Dual Polarised	35.3	Andrews	PX4F-52-N7A/A	X	2, 4
6 ft Parabolic Dual Polarised	38.1	Andrews	PX6F-52-N7A/A	-	4
60° Sectorised (External)	17.0	Laird	ANT, AP Sector	-	1
90° Sectorised (External)	17.0	Laird	ANT, AP Sector	X	2
90° Sectorised (External)	17.0	Proprietary	Part No. A005189	-	1
90° Sectorised (Integrated)	16.0	MARS	MA-WD56-DP16PCMW	-	1, 3
Omnidirectional	13.0	KP	KPPA-5.7-DPOMA	X	2

X = This antenna was used for testing purposes

Note(s):

1. This antenna has the same gain or less gain and is of the same type as the antenna that was tested. Therefore it was not tested.
2. Used in conjunction with two, 0.5 metre length RF cables (Radiall R284C0351033 N type male – N type male) having an individual insertion loss of 0.9 dB across the EUT operating band.
3. Integral antenna. No external RF cables.
4. The 4 ft parabolic antenna (Andrews PX4F-52-N7A/A) has equivalent in/out of band characteristics to the 6 ft parabolic antenna (PX6F-52-N7A/A). The 4 foot antenna was used for testing in lieu of the 6 foot antenna because of the similarity between the two antennas. Antenna gain compensation was applied to the test results. Compensation was applied to obtain the reported values for the 6 foot parabolic antenna.

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- The unit operates in transceiver mode only as a TDD device in its normal mode of operation. There is no dedicated receive only mode.
- For test purposes only, the EUT was continuously transmitting at maximum power with 100% duty cycle in test mode on the required channels using the supported modulation types.

4.2. Configuration and Peripherals

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

- A laptop PC with Cambium Networks test application 'Regulatory RF Control V1.0' was used to configure the EUT via the PoE power supply and Ethernet cables.
- The EUT was powered throughout testing via the PoE power supply.
- The EUT was operating at maximum allowable output power for the configuration being tested unless otherwise stated.
- No receiver or idle mode tests were performed as the EUT constantly transmits and receives. It does not have a dedicated receive or idle mode.

Power settings used during testing

'LCF' in the tables below indicates the power setting on the lower channels. 'HCF' indicates the power setting on the higher channels. Where the tables are marked as 'Mid Ch' the maximum power setting was used for all channels from the Lowest Full Power Channel to the Highest Full Power Channel including the centre channel. Channel frequencies are shown in Section 3.4 of this report.

Point-to-Point Antennas

The table below shows the EUT power settings that were used during testing for each channel bandwidth and modulation type when the EUT was operated as a point-to-point device.

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	28	28	28	26	26	26	25	25	25	24	24	24
10	26	28	27	26	26	26	25	25	25	24	24	24
20	27	28	27	26	26	26	25	25	25	24	24	24
40	28	28	27	26	26	26	25	25	25	24	24	24

The tables below show the EUT power settings that were used during testing when the EUT was operated with the sectorised and omnidirectional antennas.

Sectorised Antenna

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75
10	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75
20	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75
40	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75	20.75

Omnidirectional Antenna

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24	24	24
10	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24	24	24
20	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24	24	24
40	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24	24	24

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.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results**5.2.1. Transmitter AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Ian Watch	Test Date:	07 March 2015
Test Sample Serial Number:	F5098BB0073		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10-2013 Section 6.2 referencing ANSI C63.4-2014 in accordance with published KDB 174176 D01

Environmental Conditions:

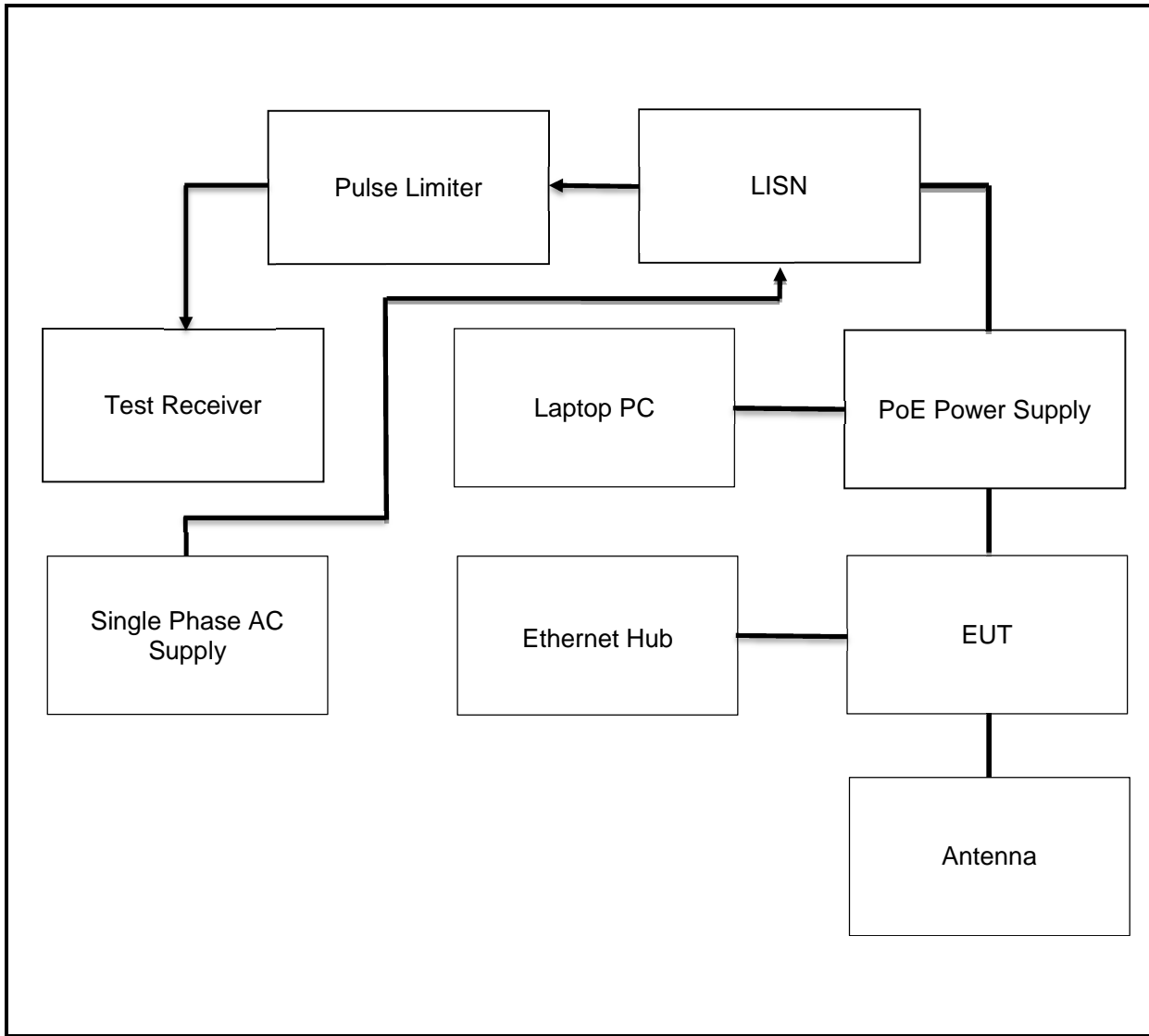
Temperature (°C):	24
Relative Humidity (%):	31

Note(s):

1. The manufacturer stated that two different PoE power supplies can be used with this product. AC conducted spurious emissions tests were performed on each power supply.
2. The input to the PoE power supply was connected to a 120 VAC 60 Hz single phase supply via a LISN during the testing. The output of the PoE power supply was connected to the input of the EUT via an Ethernet cable.
3. The EUT was transmitting at maximum power during the test. A laptop PC was connected to the EUT via Ethernet. The unused Ethernet port on the EUT was terminated into an Ethernet hub.
4. The earth bonding point on the EUT was connected to the metal structure of the test chamber during testing.
5. The six highest level emissions in each mode were recorded in the tables below.

Transmitter AC Conducted Spurious Emissions (continued)

Test setup for AC conducted spurious emissions measurements:



Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / LEADER Power Supply**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.172	Live	54.5	64.8	10.3	Complied
0.303	Live	52.3	60.2	7.9	Complied
0.600	Live	41.0	56.0	15.0	Complied
0.829	Live	41.1	56.0	14.9	Complied
1.000	Live	45.7	56.0	10.3	Complied
1.554	Live	39.8	56.0	16.2	Complied

Results: Live / Average / LEADER Power Supply

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.177	Average	45.7	54.6	8.9	Complied
0.307	Average	48.0	50.0	2.0	Complied
0.532	Average	36.1	46.0	9.9	Complied
0.793	Average	35.3	46.0	10.7	Complied
1.000	Average	41.9	46.0	4.1	Complied
1.275	Average	34.7	46.0	11.3	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak / LEADER Power Supply**

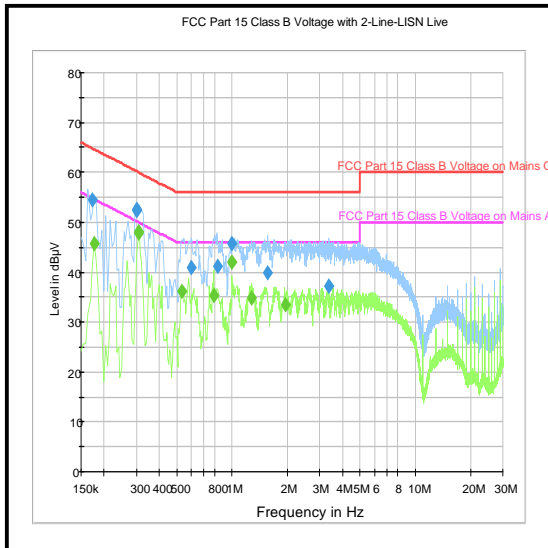
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.294	Neutral	49.9	60.4	10.5	Complied
0.483	Neutral	37.9	56.3	18.4	Complied
0.784	Neutral	37.0	56.0	19.0	Complied
1.000	Neutral	42.5	56.0	13.5	Complied
1.360	Neutral	36.6	56.0	19.4	Complied
28.999	Neutral	44.1	60.0	15.9	Complied

Results: Neutral / Average / LEADER Power Supply

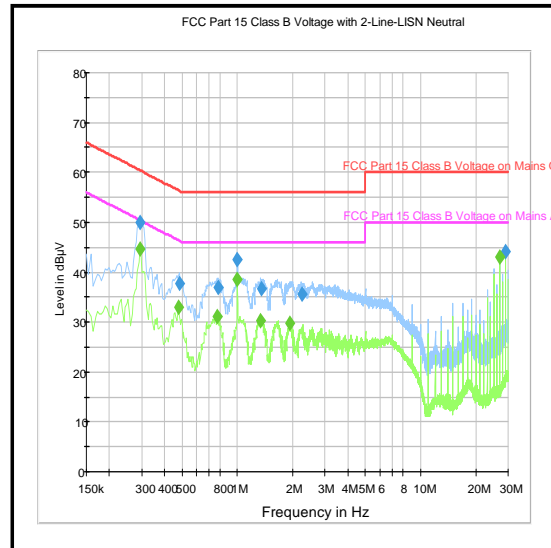
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.294	Neutral	44.5	50.4	5.9	Complied
0.478	Neutral	32.9	46.4	13.5	Complied
0.780	Neutral	31.0	46.0	15.0	Complied
1.000	Neutral	38.5	46.0	7.5	Complied
1.333	Neutral	30.3	46.0	15.7	Complied
27.001	Neutral	43.0	50.0	7.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: LEADER Power Supply



Live



Neutral

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / Cambium Networks Power Supply**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.258	Live	45.6	61.5	15.9	Complied
0.600	Live	40.1	56.0	15.9	Complied
1.000	Live	44.0	56.0	12.0	Complied
4.713	Live	37.7	56.0	18.3	Complied
20.998	Live	42.2	60.0	17.8	Complied
24.999	Live	49.7	60.0	10.3	Complied

Results: Live / Average / Cambium Networks Power Supply

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.600	Live	39.8	46.0	6.2	Complied
1.000	Live	44.0	46.0	2.0	Complied
1.671	Live	36.3	46.0	9.7	Complied
2.314	Live	37.6	46.0	8.4	Complied
20.998	Live	42.0	50.0	8.0	Complied
24.999	Live	49.6	50.0	0.4	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak / Cambium Networks Power Supply**

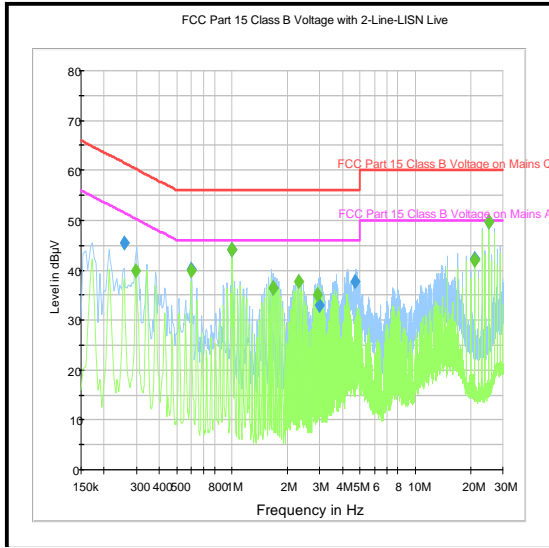
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.172	Neutral	44.0	64.8	20.8	Complied
0.600	Neutral	39.9	56.0	16.1	Complied
1.000	Neutral	44.3	56.0	11.7	Complied
1.711	Neutral	37.5	56.0	18.5	Complied
16.998	Neutral	43.4	60.0	16.6	Complied
23.001	Neutral	44.4	60.0	15.6	Complied

Results: Neutral / Average / Cambium Networks Power Supply

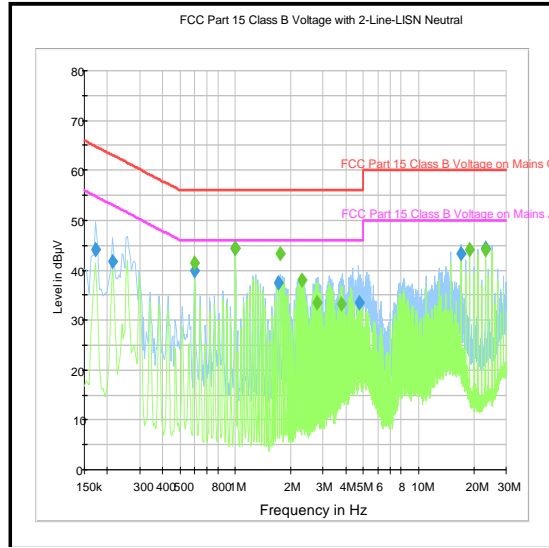
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.600	Neutral	41.4	46.0	4.6	Complied
1.000	Neutral	44.3	46.0	1.7	Complied
1.756	Neutral	43.3	46.0	2.7	Complied
2.314	Neutral	38.0	46.0	8.0	Complied
19.000	Neutral	44.1	50.0	5.9	Complied
23.001	Neutral	44.2	50.0	5.8	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Cambium Networks Power Supply



Live



Neutral

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	14 Aug 2015	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	02 Mar 2016	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	14 Oct 2016	12
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	14 Mar 2015	12

5.2.2. Minimum 6 dB Bandwidth**Test Summary:**

Test Engineer:	Ian Watch	Test Date:	26 February 2015
Test Sample Serial Number:	F50980BB0073		

FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8 Option 1 and Notes below

Environmental Conditions:

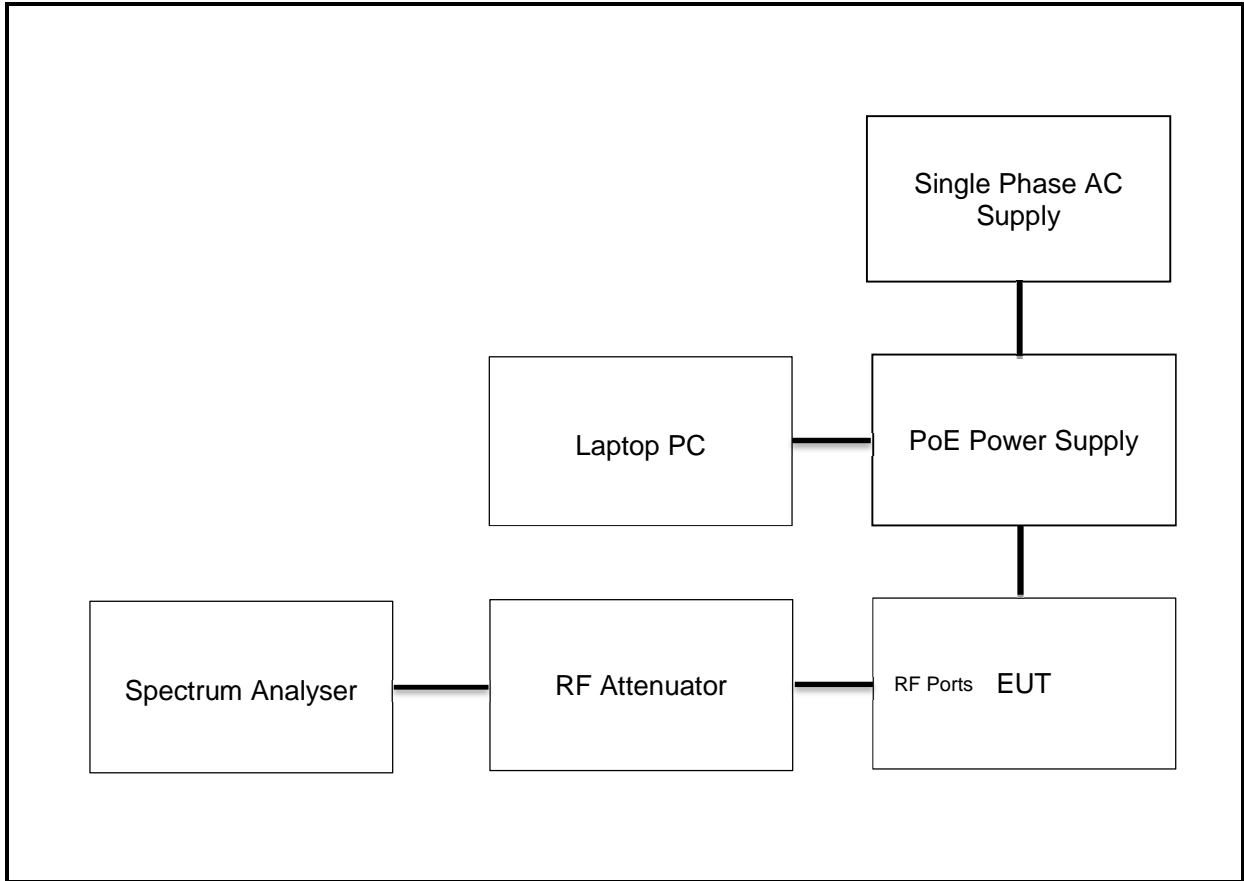
Temperature (°C):	22
Relative Humidity (%):	51

Note(s):

1. Minimum 6 dB bandwidth measurements were performed on both RF ports with the EUT transmitting at maximum power with QPSK and 256QAM modulation types. Only 5 MHz channels were tested as this has the narrowest bandwidth and is closest to the minimum 6 dB bandwidth limit of ≥ 500 kHz. Bottom, middle and top channels were tested.
2. Spot checks were also performed on 16QAM and 64QAM with a 5 MHz channel and the results were found to be comparable to QPSK and 256QAM. Results for these configurations are archived on the test laboratory IT server and are available for inspection if required.
3. An RF level offset of 22.1 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 32.1 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used.

Minimum 6 dB Bandwidth (continued)

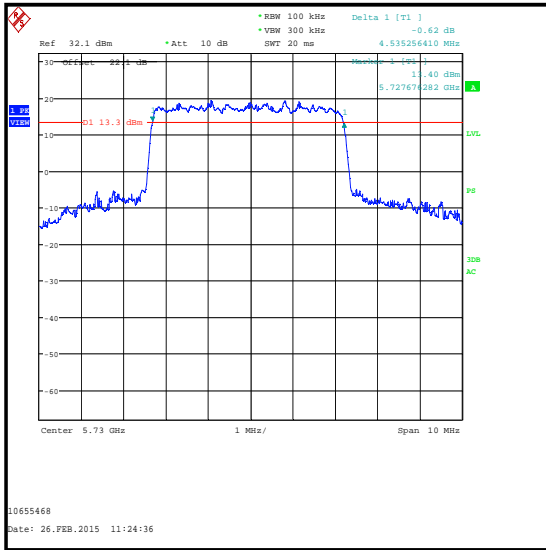
Test setup for bandwidth measurements:



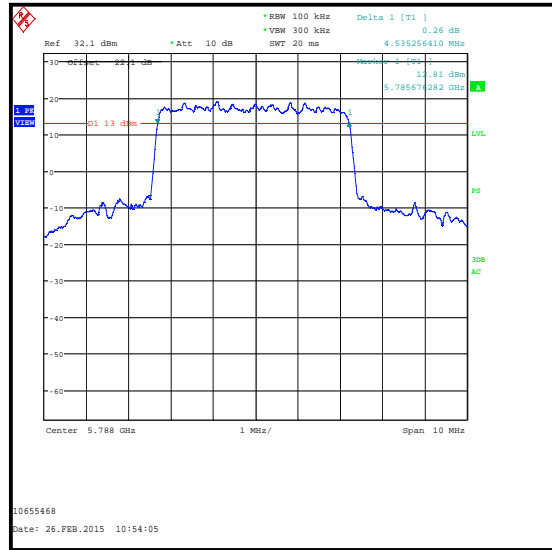
Minimum 6 dB Bandwidth (continued)

Results: 5 MHz Channel / QPSK / A Port

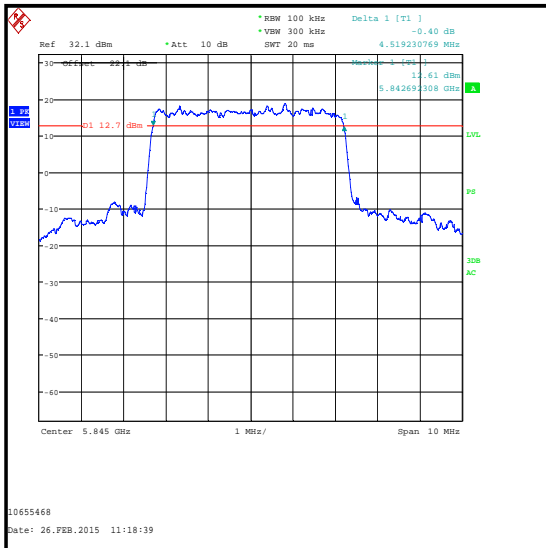
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.535	≥0.5	4.035	Complied
Middle	4.535	≥0.5	4.035	Complied
Top	4.519	≥0.5	4.019	Complied



Bottom Channel



Middle Channel

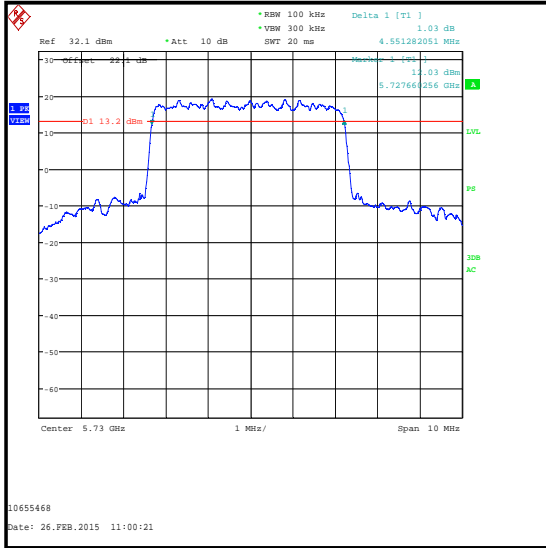


Top Channel

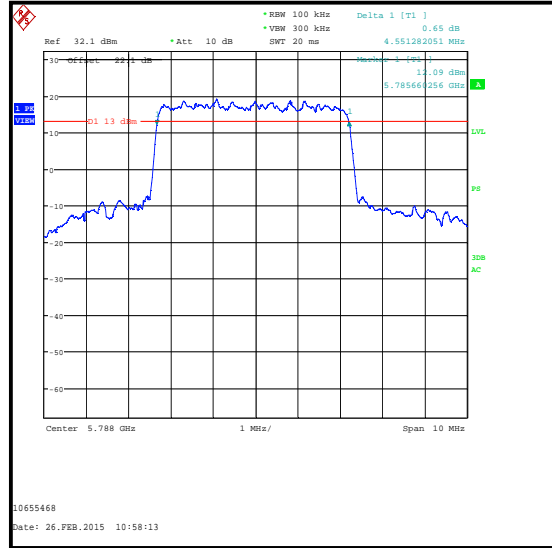
Minimum 6 dB Bandwidth (continued)

Results: 5 MHz Channel / QPSK / B Port

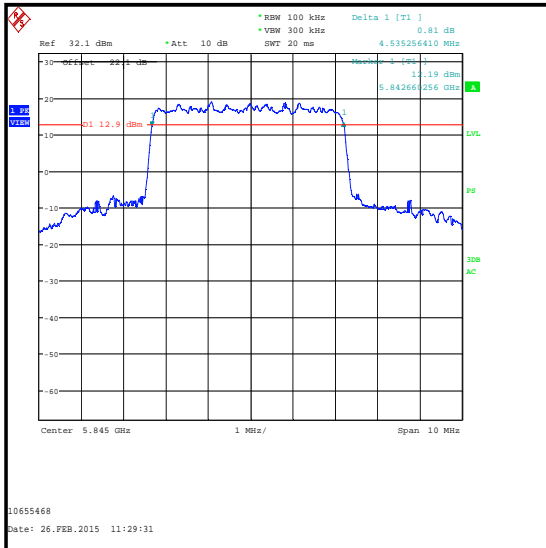
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.551	≥0.5	4.051	Complied
Middle	4.551	≥0.5	4.051	Complied
Top	4.535	≥0.5	4.035	Complied



Bottom Channel



Middle Channel

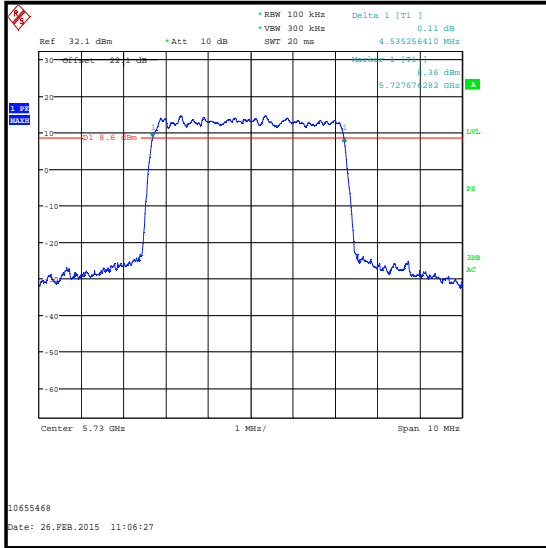


Top Channel

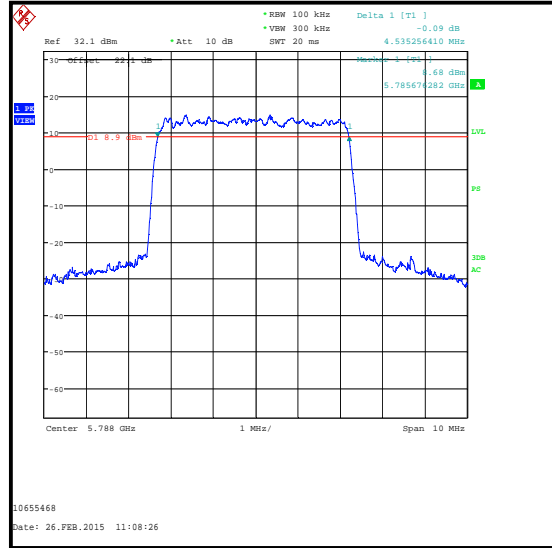
Minimum 6 dB Bandwidth (continued)

Results: 5 MHz Channel / 256QAM / A Port

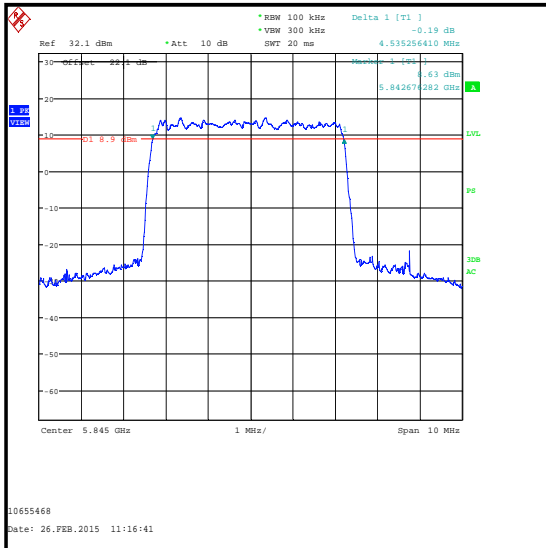
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.535	≥0.5	4.035	Complied
Middle	4.535	≥0.5	4.035	Complied
Top	4.535	≥0.5	4.035	Complied



Bottom Channel



Middle Channel

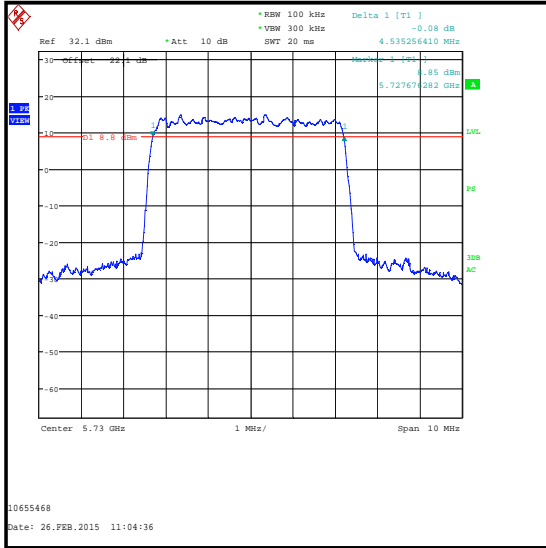


Top Channel

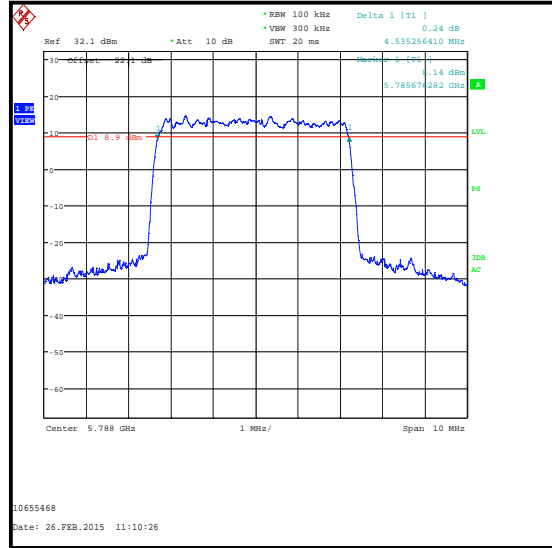
Minimum 6 dB Bandwidth (continued)

Results: 5 MHz Channel / 256QAM / B Port

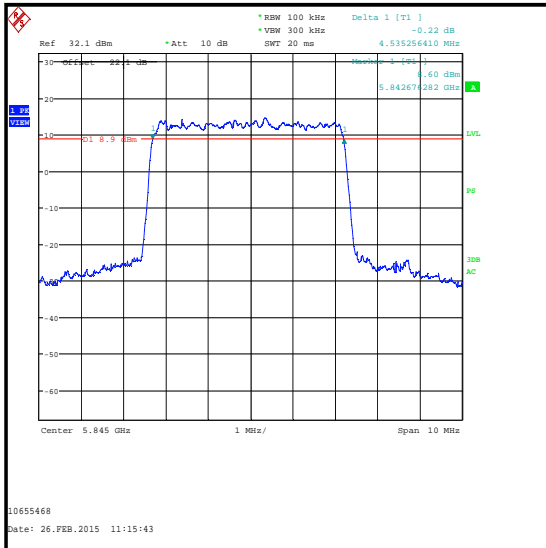
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.535	≥0.5	4.035	Complied
Middle	4.535	≥0.5	4.035	Complied
Top	4.535	≥0.5	4.035	Complied



Bottom Channel



Middle Channel



Top Channel

Minimum 6 dB Bandwidth (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A2527	Attenuator	AtlanTecRF	AN18W5-20	832828#2	Calibrated before use	N/A
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	14 Mar 2015	12

5.2.3. Power Spectral Density**Test Summary:**

Test Engineer:	Ian Watch	Test Dates:	02 March 2015 & 03 March 2015
Test Sample Serial Number:	F50980BB0073		

FCC Reference:	Part 15.247(e)
Test Method Used:	KDB 558074 v03r02 Section 10.3 Method AVGPS-1, KDB 662911 D02 & Notes below

Environmental Conditions:

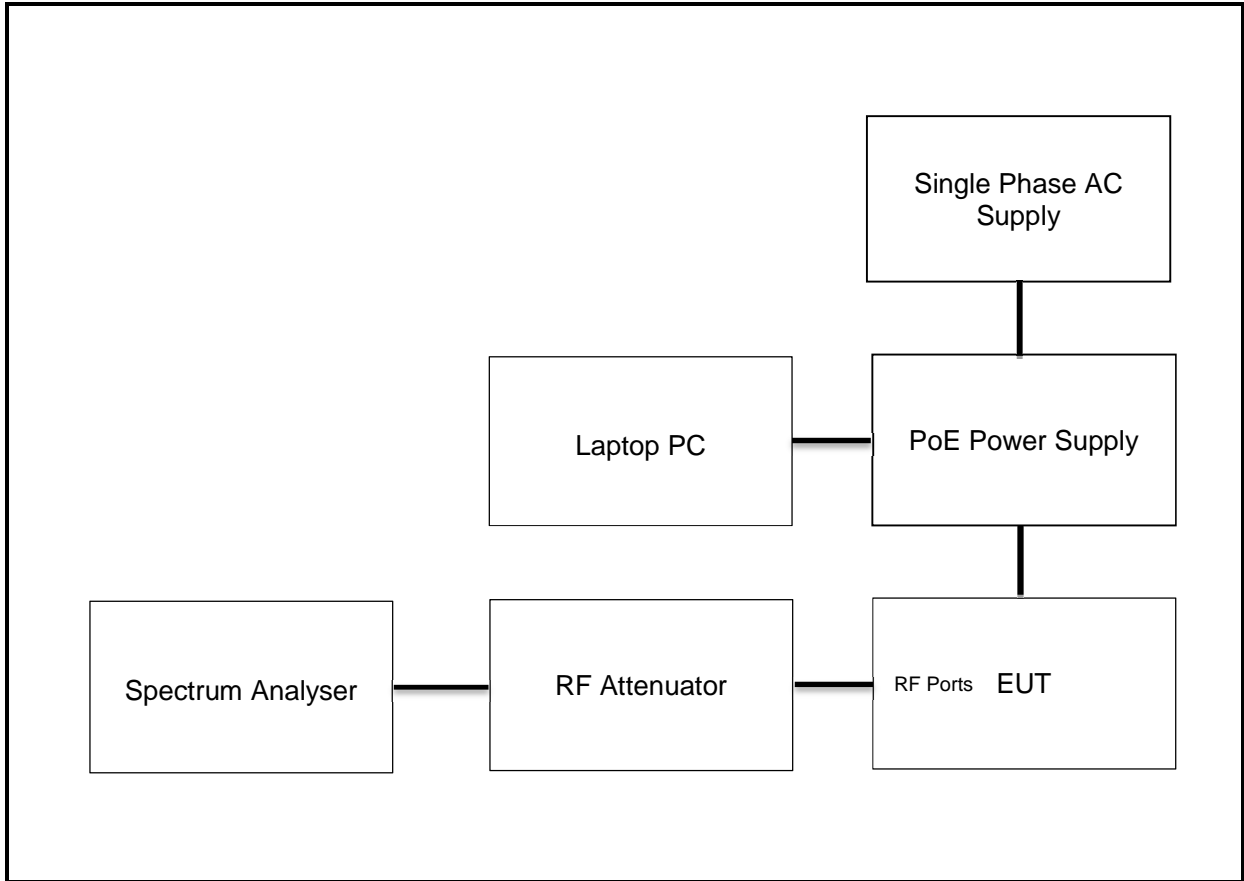
Temperature (°C):	22 to 23
Relative Humidity (%):	31 to 34

Note(s):

1. Transmitter Power Spectral Density tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 10.3 Method AVGPS-1.
2. The EUT was transmitting at 100% duty cycle at the highest power setting for each mode.
3. Tests were performed on 5 MHz channels as these have the highest output power. QPSK and 16QAM were tested. 16QAM operates with a higher power setting than 64QAM and 256QAM and was deemed to be worst case.
4. Measurements were performed on the A and B RF ports. An RMS detector was used. The PSD from both ports was linearly combined and then subtracted from the limit to obtain the margin. An RF attenuator was fitted between the EUT port and spectrum analyser. An RF level offset of 20.8 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 30.8 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used.
5. Trace averaging was performed over at least 100 traces. This was confirmed by viewing the spectrum analyser screen at the end of each test.

Power Spectral Density (continued)

Test setup for power spectral density measurements:

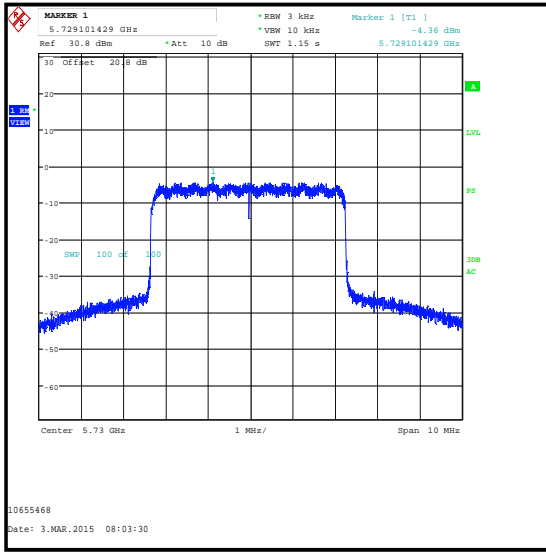


Power Spectral Density (continued)

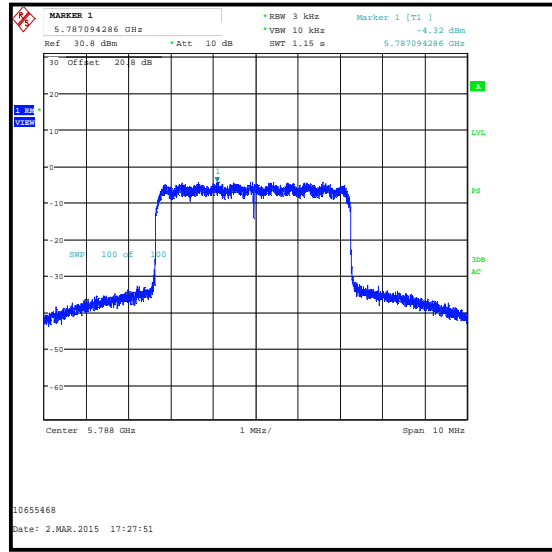
Results: 5 MHz Channel / QPSK

Channel	PSD at A Port (dBm / 3 kHz)	PSD at B Port (dBm / 3 kHz)	Combined PSD (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	-4.4	-4.0	-1.2	8.0	9.2	Complied
Middle	-4.3	-4.4	-1.3	8.0	9.3	Complied
Top	-4.1	-4.1	-1.1	8.0	9.1	Complied

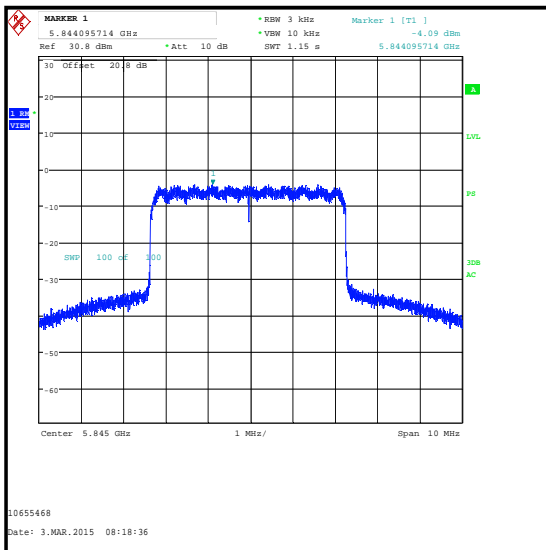
Results: 5 MHz Channel / QPSK / A Port



Bottom Channel



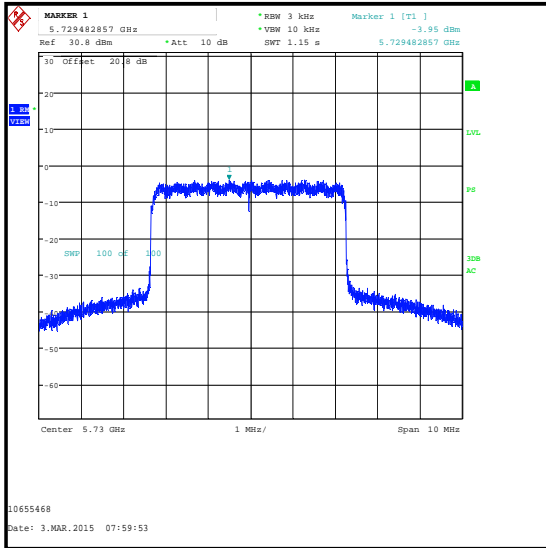
Middle Channel



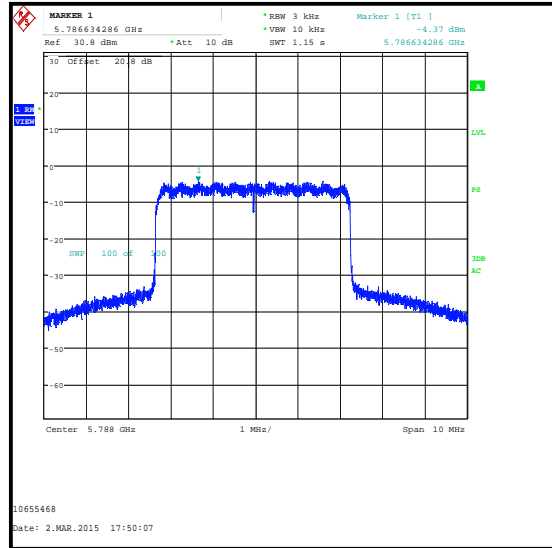
Top Channel

Power Spectral Density (continued)

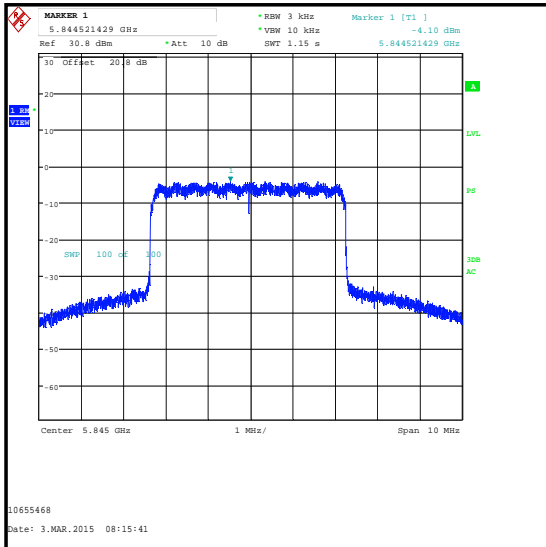
Results: 5 MHz Channel / QPSK / B Port



Bottom Channel



Middle Channel



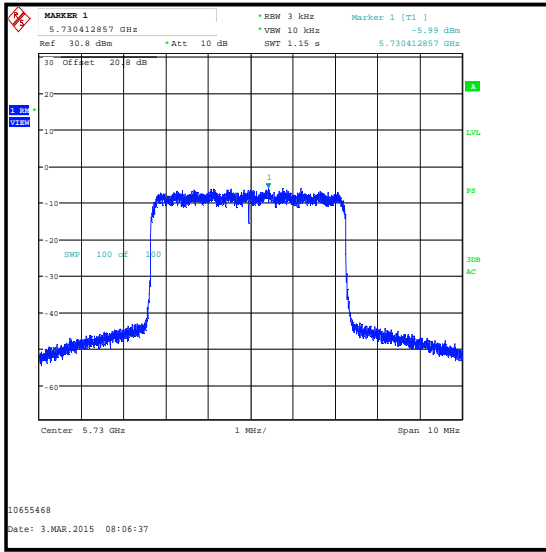
Top Channel

Power Spectral Density (continued)

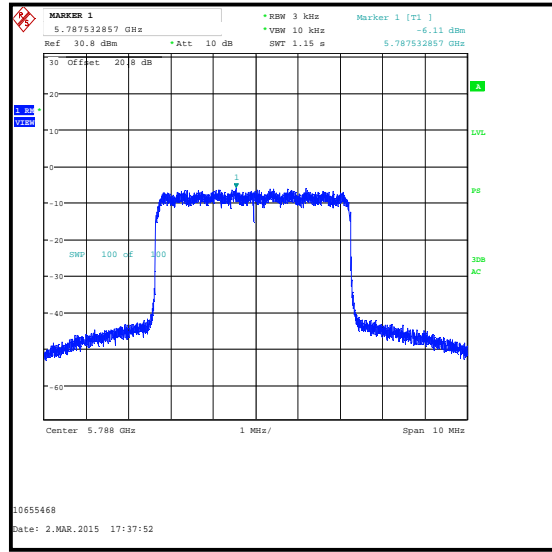
Results: 5 MHz Channel / 16QAM

Channel	PSD at A Port (dBm / 3 kHz)	PSD at B Port (dBm / 3 kHz)	Combined PSD (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	-6.0	-5.5	-2.7	8.0	10.7	Complied
Middle	-6.1	-5.8	-2.9	8.0	10.9	Complied
Top	-5.7	-6.1	-2.9	8.0	10.9	Complied

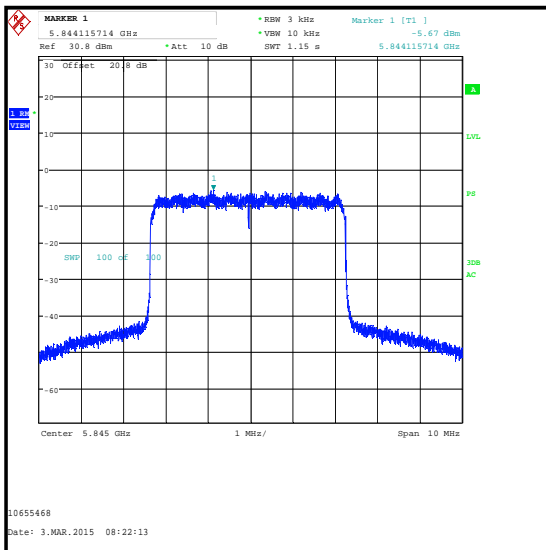
Results: 5 MHz Channel / 16QAM / A Port



Bottom Channel



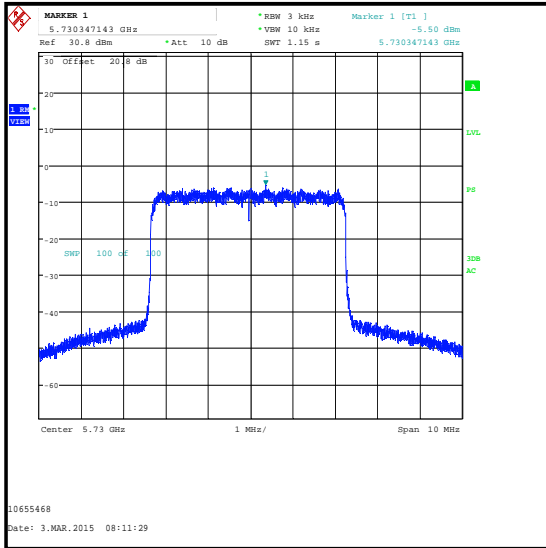
Middle Channel



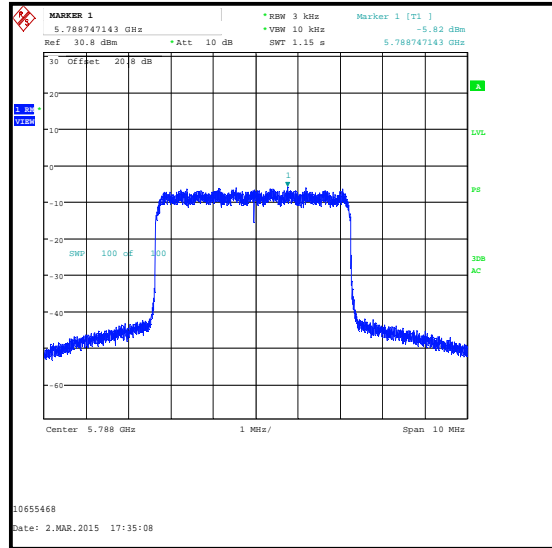
Top Channel

Power Spectral Density (continued)

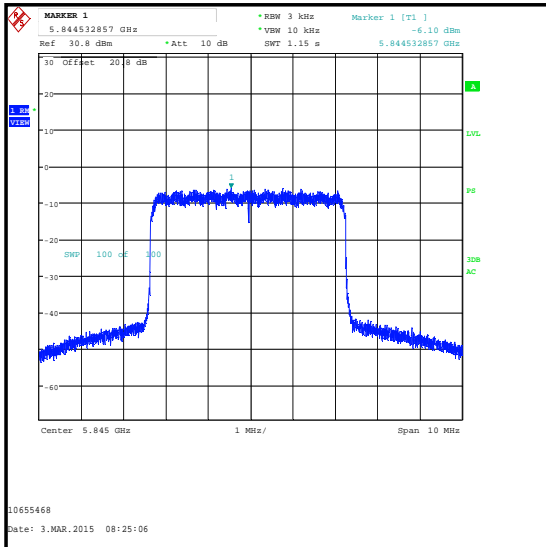
Results: 5 MHz Channel / 16QAM / B Port



Bottom Channel



Middle Channel



Top Channel

Power Spectral Density (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	Calibrated Before Use	N/A
M1886	Test Receiver	Rohde & Schwarz	ESU	100554	09 May 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	24 Apr 2015	12
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	14 Mar 2015	12

5.2.4. Maximum Conducted Output Power**Test Summary:**

Test Engineer:	Ian Watch	Test Date:	04 March 2015
Test Sample Serial Number:	F50980BB0073		

FCC Reference:	Part 15.247(b)(3), 15.147(b)(4) & Part 15.247(c)(1)(ii)
Test Method Used:	KDB 558074 Section 9.2.3.1 & KDB 662911 D02

Environmental Conditions:

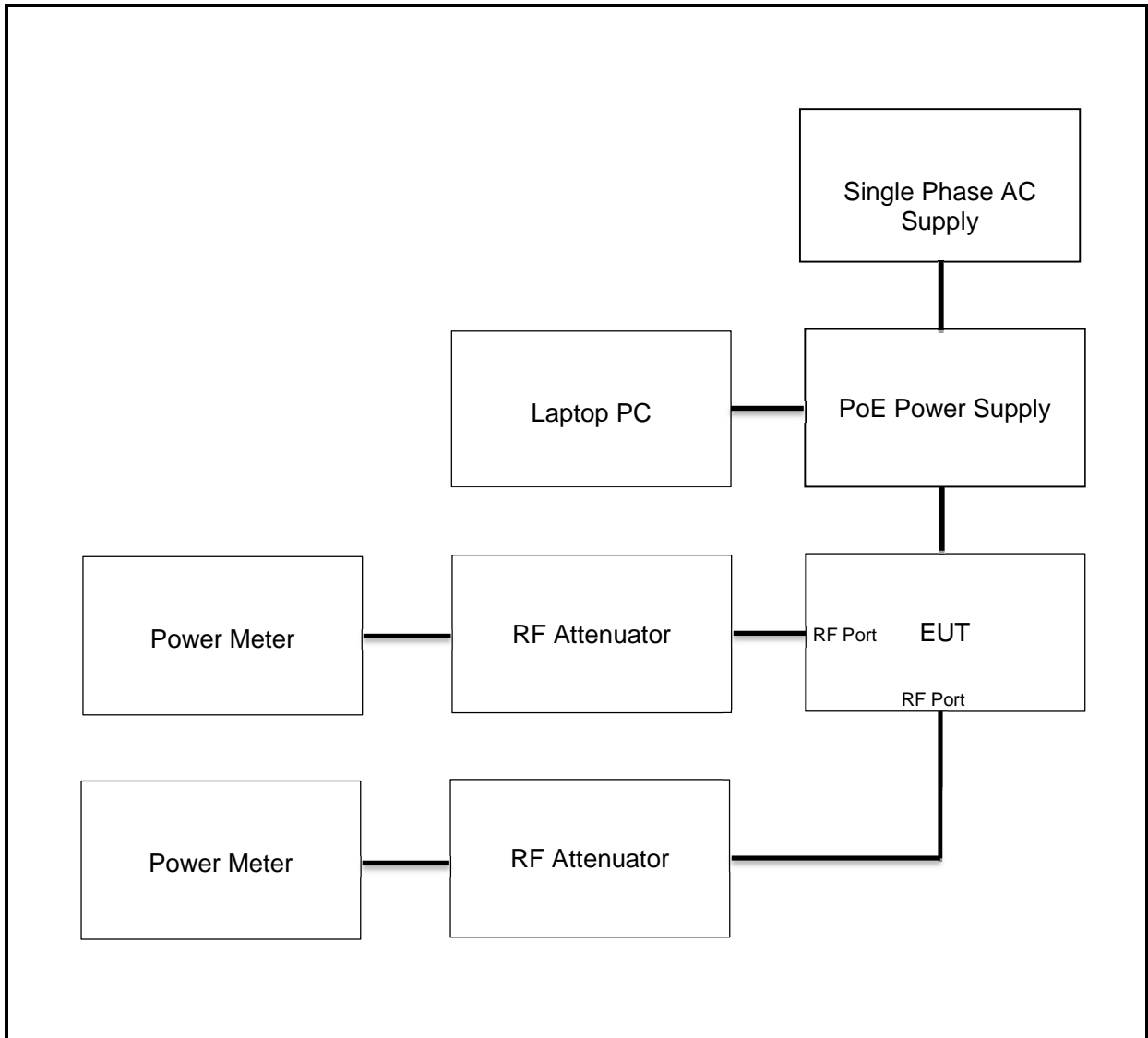
Temperature (°C):	24
Relative Humidity (%):	32

Note(s):

1. Conducted power tests in all bands were performed using wideband average power meters and associated power sensors in accordance with FCC KDB 558074 Section 9.2.3.1 Measurement Procedure AVGPM. RF attenuators were fitted between the EUT and power sensors. The attenuator loss was measured prior to performing the measurements and the loss compensation incorporated into the measurement results.
2. Preliminary tests were made on all supported modulation types to determine worst case (highest power) operation. Highest power was observed in QPSK mode on all channel widths. The EUT is designed to operate with maximum power settings for 16QAM, 64QAM and 256QAM that are lower or the same as QPSK. Only QPSK was tested and recorded in this test report although all other configurations were spot checked and found to be compliant. Test results for other configurations are archived on the UL VS LTD IT server and available for inspection if required.
3. Tests in point-point mode. This mode covers plate antennas and parabolic antennas. Tests were performed with the EUT transmitting at power levels shown for point-to-point configurations shown in Section 4.2 of this test report. No E.I.R.P. limit is specified for point-to point operation as the system can be configured as a fixed link using directional antennas with gains greater than 6 dBi. According to FCC Part 15.247(c)(1)(ii), systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.
4. Tests in sectorised (point-to-multipoint) and omnidirectional modes. Conducted power limits were reduced by 1 dB for each dB that the stated gain of the antenna exceeded 6 dB in accordance with FCC Part 15.247(b)(4), the power settings of the the EUT were reduced accordingly. In addition, 0.9 dB has been subtracted from the stated antenna gains for point-to-multipoint antennas. This is the insertion loss for the shortest length RF cables that can be used to connect the EUT RF ports to the antennas used during testing. Tests were performed with the EUT transmitting at power levels shown for sectorised and omnidirectional antenna configurations shown in Section 4.2 of this test report.
5. The transmitter was continuously transmitting with 100% duty cycle on the required channels during the tests.
6. Power from both ports was measured and combined using the measure-and-sum method stated in FCC KDB 662911 D02.

Maximum Conducted Output Power (continued)

Test setup for conducted power measurements:



Maximum Conducted Output Power (continued)**Results: 5 MHz Channel / QPSK / Directional Antennas / Point-to-Point**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	24.7	24.5	27.6	30.0	2.4	Complied
Middle	24.9	24.3	27.6	30.0	2.4	Complied
Top	24.4	24.2	27.3	30.0	2.7	Complied

Results: 10 MHz Channel / QPSK / Directional Antennas / Point-to-Point

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	22.4	22.2	25.3	30.0	4.7	Complied
Middle	24.8	24.2	27.5	30.0	2.5	Complied
Top	23.3	23.0	26.2	30.0	3.8	Complied

Results: 20 MHz Channel / QPSK / Directional Antennas / Point-to-Point

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	23.6	23.1	26.4	30.0	3.6	Complied
Middle	24.8	24.2	27.5	30.0	2.5	Complied
Top	23.3	22.9	26.1	30.0	3.9	Complied

Results: 40 MHz Channel / QPSK / Directional Antennas / Point-to-Point

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	23.4	23.0	26.2	30.0	3.8	Complied
Middle	24.7	24.2	27.5	30.0	2.5	Complied
Top	23.3	23.0	26.2	30.0	3.8	Complied

Maximum Conducted Output Power (continued)**Results: 5 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	16.6	16.5	19.6	19.9	0.3	Complied
Middle	16.8	16.3	19.6	19.9	0.3	Complied
Top	16.6	16.4	19.5	19.9	0.4	Complied

Results: 5 MHz Channel / QPSK / 17 dBi Sectorised Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	19.6	16.1	35.7	36.0	0.3	Complied
Middle	19.6	16.1	35.7	36.0	0.3	Complied
Top	19.5	16.1	35.6	36.0	0.4	Complied

Results: 10 MHz Channel / QPSK / 17 dBi Sectorised Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	16.5	16.4	19.5	19.9	0.4	Complied
Middle	16.8	16.2	19.5	19.9	0.4	Complied
Top	16.5	16.4	19.5	19.9	0.4	Complied

Results: 10 MHz Channel / QPSK / 17 dBi Sectorised Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	19.5	16.1	35.6	36.0	0.4	Complied
Middle	19.5	16.1	35.6	36.0	0.4	Complied
Top	19.5	16.1	35.6	36.0	0.4	Complied

Maximum Conducted Output Power (continued)**Results: 20 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	16.8	16.5	19.6	19.9	0.3	Complied
Middle	16.8	16.1	19.5	19.9	0.4	Complied
Top	16.6	16.3	19.5	19.9	0.4	Complied

Results: 20 MHz Channel / QPSK / 17 dBi Sectorised Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	19.6	16.1	35.7	36.0	0.3	Complied
Middle	19.5	16.1	35.6	36.0	0.4	Complied
Top	19.5	16.1	35.6	36.0	0.4	Complied

Results: 40 MHz Channel / QPSK / 17 dBi Sectorised Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	16.7	16.3	19.5	19.9	0.4	Complied
Middle	16.8	16.2	19.5	19.9	0.4	Complied
Top	16.6	16.3	19.5	19.9	0.4	Complied

Results: 40 MHz Channel / QPSK / 17 dBi Sectorised Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	19.5	16.1	35.6	36.0	0.4	Complied
Middle	19.5	16.1	35.6	36.0	0.4	Complied
Top	19.5	16.1	35.6	36.0	0.4	Complied

Maximum Conducted Output Power (continued)**Results: 5 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	20.7	20.4	23.6	23.9	0.3	Complied
Middle	20.8	20.2	23.5	23.9	0.4	Complied
Top	20.6	20.5	23.6	23.9	0.3	Complied

Results: 5 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	23.6	12.1	35.7	36.0	0.3	Complied
Middle	23.5	12.1	35.6	36.0	0.4	Complied
Top	23.6	12.1	35.7	36.0	0.3	Complied

Results: 10 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	20.7	20.4	23.6	23.9	0.3	Complied
Middle	20.8	20.2	23.5	23.9	0.4	Complied
Top	20.5	20.4	23.5	23.9	0.4	Complied

Results: 10 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	23.6	12.1	35.7	36.0	0.3	Complied
Middle	23.5	12.1	35.6	36.0	0.4	Complied
Top	23.5	12.1	35.6	36.0	0.4	Complied

Maximum Conducted Output Power (continued)**Results: 20 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	20.7	20.2	23.5	23.9	0.4	Complied
Middle	20.9	20.2	23.6	23.9	0.3	Complied
Top	20.6	20.5	23.6	23.9	0.3	Complied

Results: 20 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	23.5	12.1	35.6	36.0	0.4	Complied
Middle	23.6	12.1	35.7	36.0	0.3	Complied
Top	23.6	12.1	35.7	36.0	0.3	Complied

Results: 40 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	20.7	20.4	23.6	23.9	0.3	Complied
Middle	20.9	20.2	23.6	23.9	0.3	Complied
Top	20.7	20.3	23.5	23.9	0.4	Complied

Results: 40 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna

Channel	Combined Conducted Peak Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	23.6	12.1	35.7	36.0	0.3	Complied
Middle	23.6	12.1	35.7	36.0	0.3	Complied
Top	23.5	12.1	35.6	36.0	0.4	Complied

Maximum Conducted Output Power (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	14 Mar 2015	12
M1435	Power Meter	Hewlett Packard	437B	3125U14631	30 Apr 2015	12
M1145	Power Meter	Hewlett Packard	437B	3737U26557	01 Jul 2015	12
M1175	Power Sensor	Hewlett Packard	8485A	2942A10299	11 Feb 2016	12
M1592	Power Sensor	Hewlett Packard	8487A	3318A02094	17 Sep 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	24 Apr 2015	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	Calibrated Before Use	N/A
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	Calibrated Before Use	N/A

5.2.5. Band Edge Conducted Emissions

Test Engineer:	Ian Watch	Test Dates:	23 February 2015, 24 February 2015, 25 February 2015 & 03 March 2015
Test Sample Serial Number:	F50980BB0073		

FCC Reference:	Part 15.247(d)
Test Method Used:	FCC KDB 558074 Sections 11 and 13; FCC KDB 662911 D01 E)3)b; ANSI C63.10-2009 Section 6.9.2 and Notes below

Environmental Conditions:

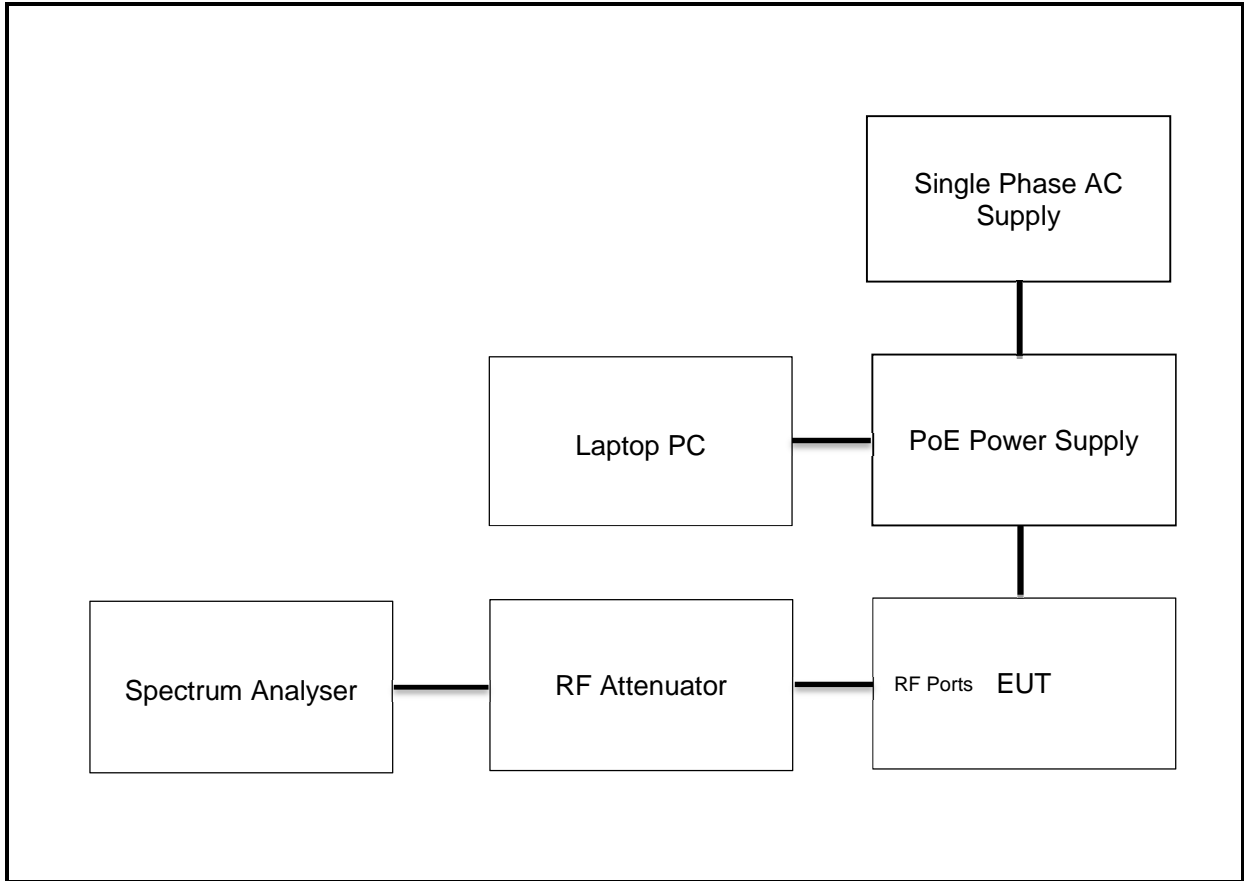
Temperature (°C):	22 to 26
Relative Humidity (%):	29 to 36

Note(s):

1. The EUT was set to transmit on the bottom channel when performing measurements at the lower band edge and the top channel when performing measurements at the upper band edge.
2. An RF cable and 20 dB attenuator connecting the EUT to the spectrum analyser were calibrated before testing commenced. An RF level offset of 22.1 dB was used on the spectrum analyser to compensate for the attenuator and cable loss at both band edges. A spectrum analyser reference level of 32.1 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used. The spectrum analyser centre frequency was adjusted to incorporate bottom and top channels at the upper or lower band edges. Span was adjusted so that it encompassed the DTS bandwidth in order to determine the reference levels for each mode of operation. The spectrum analyser resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The EUT was set to transmit at the maximum power (as stated in Section 4.2 of this test report) with 100% duty cycle for all supported channel bandwidths. The spectrum analyser was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emission levels. A marker and corresponding reference level line were placed on the peak of the carrier. Non-restricted bands are adjacent to the lower and upper band edges. As the maximum conducted output power was measured using an average power meter in accordance with FCC KDB 558074 Section 9.2.3.1, an out-of-band limit line was placed 30 dB (FCC KDB 558074 Section 11.1(b)) below the peak level. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent non-restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
3. The manufacturer has reduced power on the highest and lowest channels for some operating modes and channel bandwidths in order to comply with band edge limits. Band edge measurements were also performed with the EUT transmitting at nominal (full) power on the lowest channel and highest channels that operate at full power. These results are held on the test laboratory IT server and available for inspection if required.

Band Edge Conducted Emissions (continued)

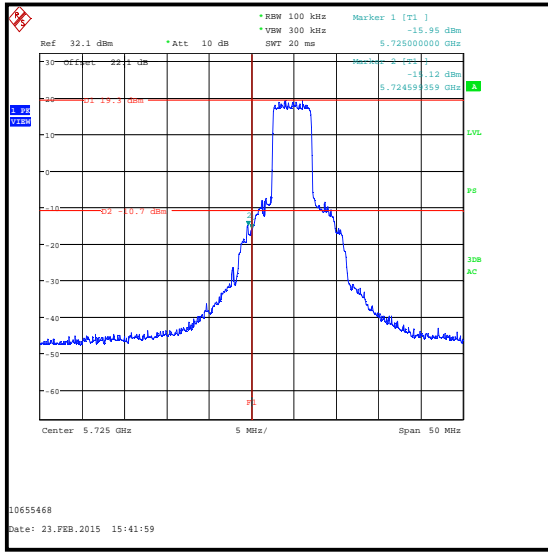
Test setup for conducted band edge measurements:



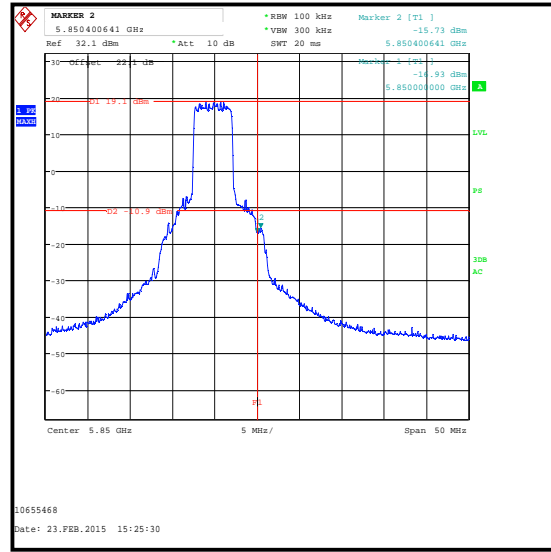
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / QPSK / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.599	-15.1	-10.7	4.4	Complied
5725	-15.9	-10.7	5.2	Complied
5850	-16.9	-10.9	6.0	Complied
5850.401	-15.7	-10.9	4.8	Complied



Lower Band Edge Peak Measurement

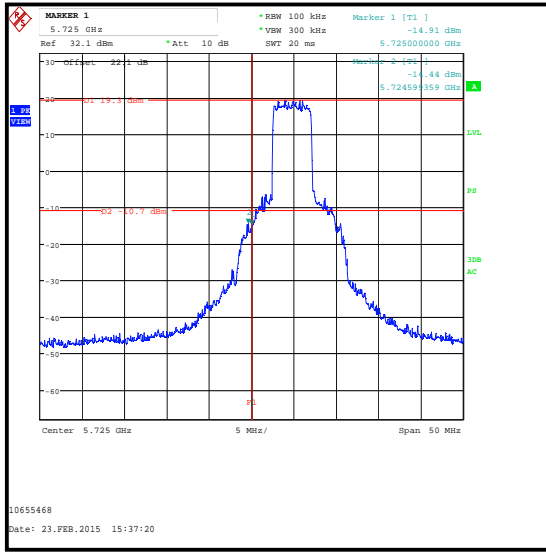


Upper Band Edge Peak Measurement

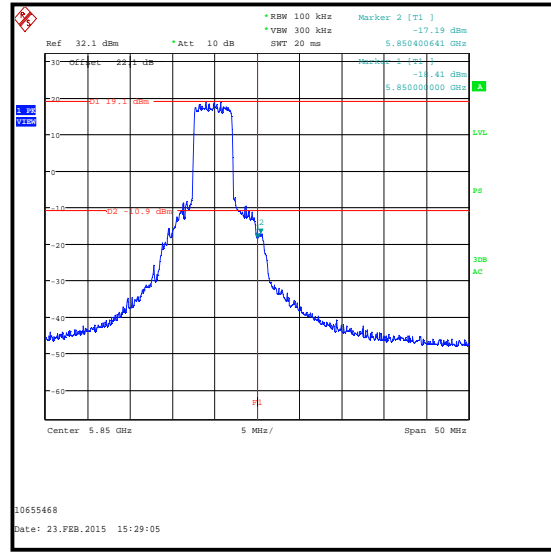
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / QPSK / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.599	-14.4	-10.7	3.7	Complied
5725	-14.9	-10.7	4.2	Complied
5850	-18.4	-10.9	7.5	Complied
5850.401	-17.2	-10.9	6.3	Complied



Lower Band Edge Peak Measurement

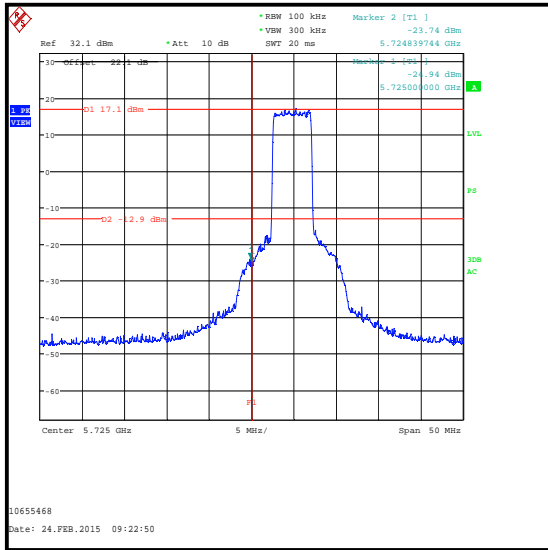


Upper Band Edge Peak Measurement

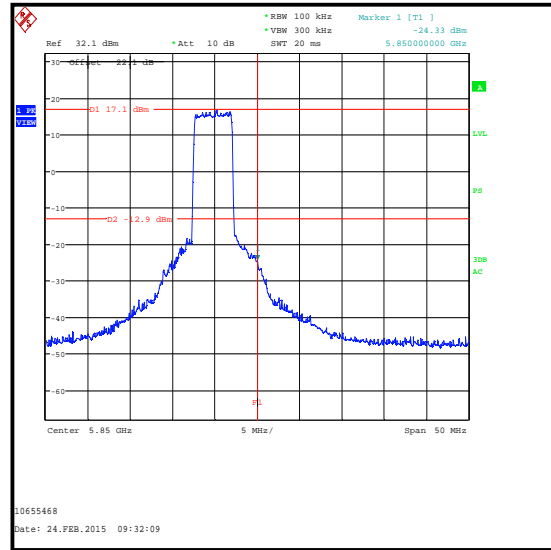
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / 16QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-23.7	-12.9	10.8	Complied
5725	-24.9	-12.9	12.0	Complied
5850	-24.3	-12.9	11.4	Complied



Lower Band Edge Peak Measurement

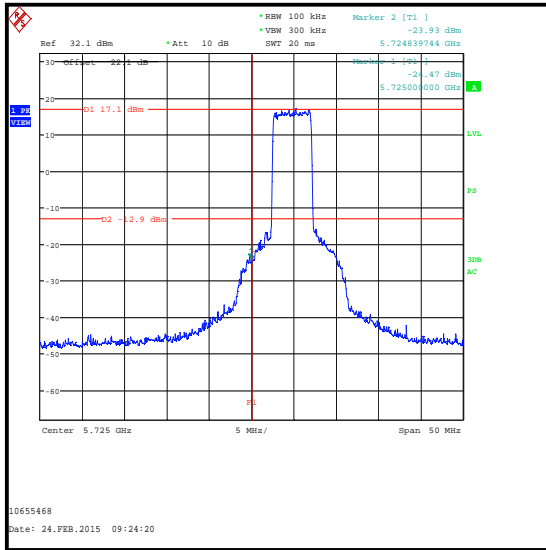


Upper Band Edge Peak Measurement

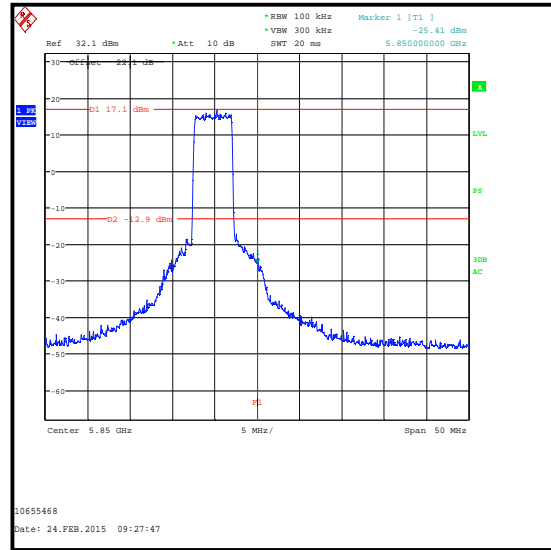
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / 16QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-23.9	-12.9	11.0	Complied
5725	-24.5	-12.9	11.6	Complied
5850	-25.4	-12.9	12.5	Complied



Lower Band Edge Peak Measurement

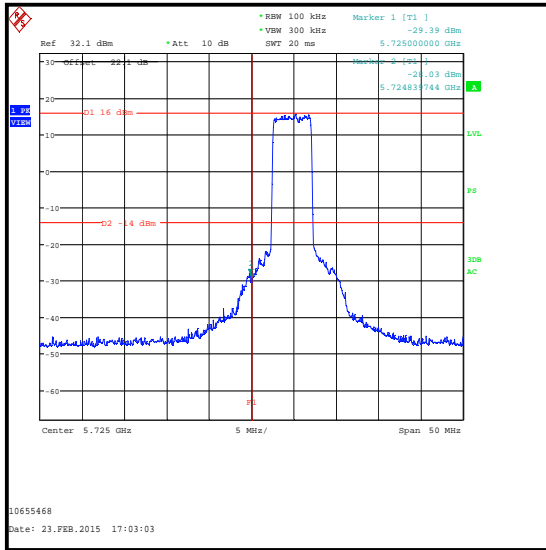


Upper Band Edge Peak Measurement

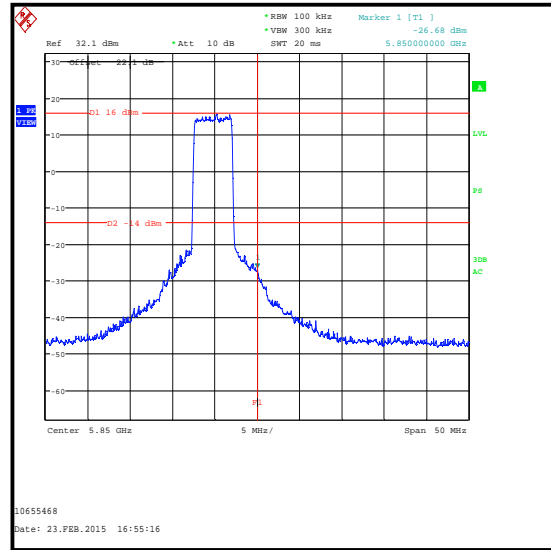
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / 64QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-28.0	-14.0	14.0	Complied
5725	-29.4	-14.0	15.4	Complied
5850	-26.7	-14.0	12.7	Complied



Lower Band Edge Peak Measurement

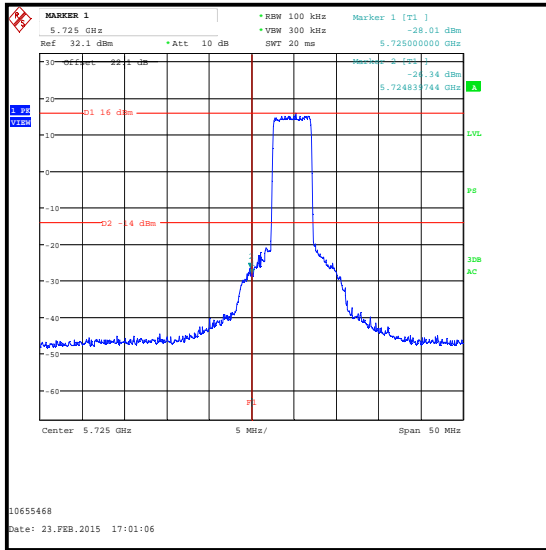


Upper Band Edge Peak Measurement

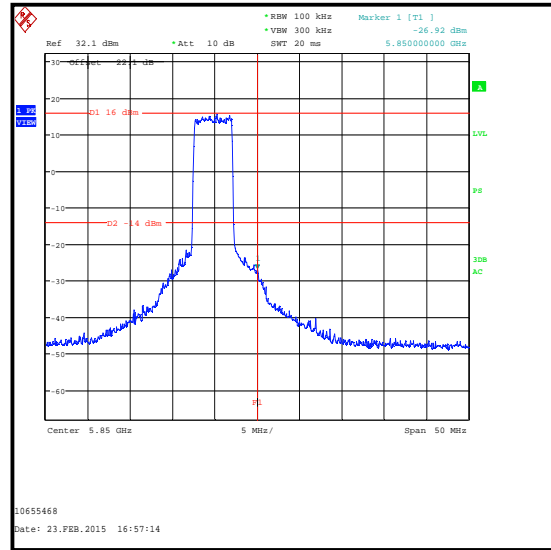
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / 64QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-26.3	-14.0	12.3	Complied
5725	-28.0	-14.0	14.0	Complied
5850	-26.9	-14.0	12.9	Complied



Lower Band Edge Peak Measurement

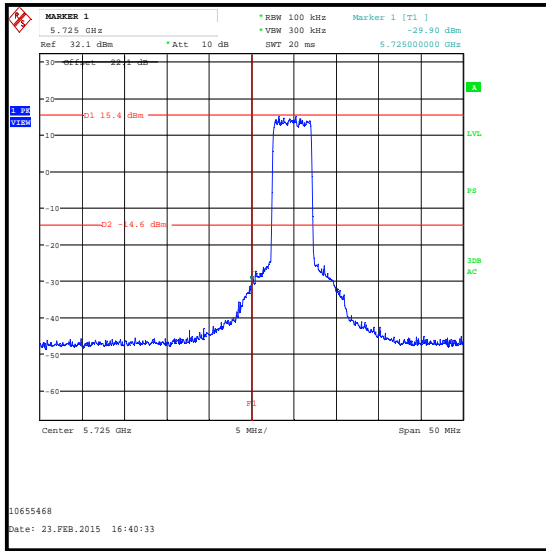


Upper Band Edge Peak Measurement

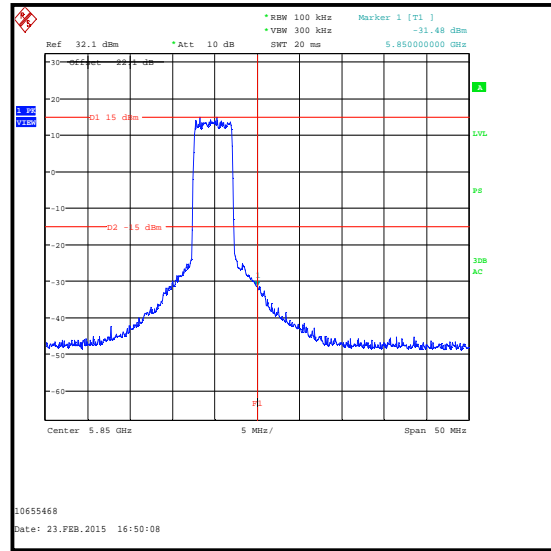
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / 256QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-29.9	-14.6	15.3	Complied
5850	-31.5	-15.0	16.5	Complied



Lower Band Edge Peak Measurement

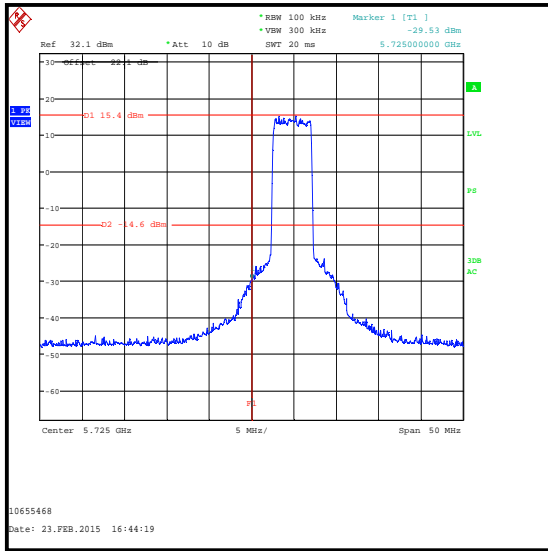


Upper Band Edge Peak Measurement

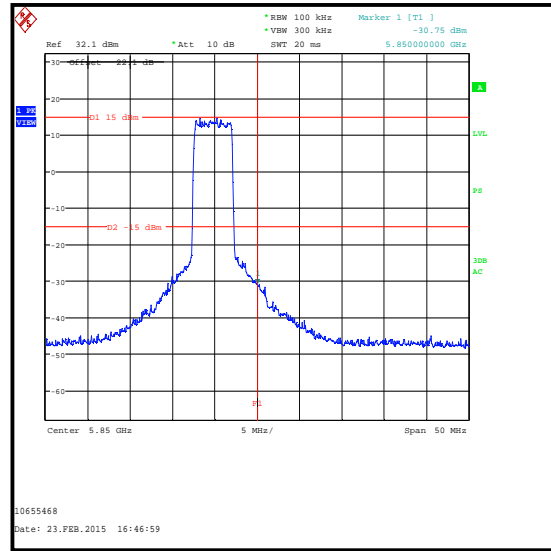
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / 256QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-29.5	-14.6	14.9	Complied
5850	-30.7	-15.0	15.7	Complied



Lower Band Edge Peak Measurement

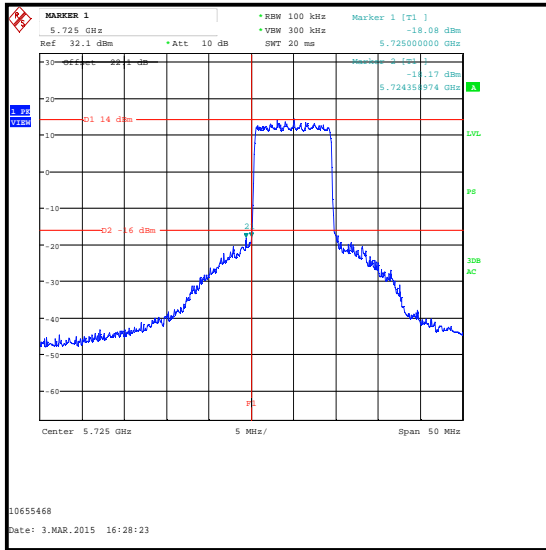


Upper Band Edge Peak Measurement

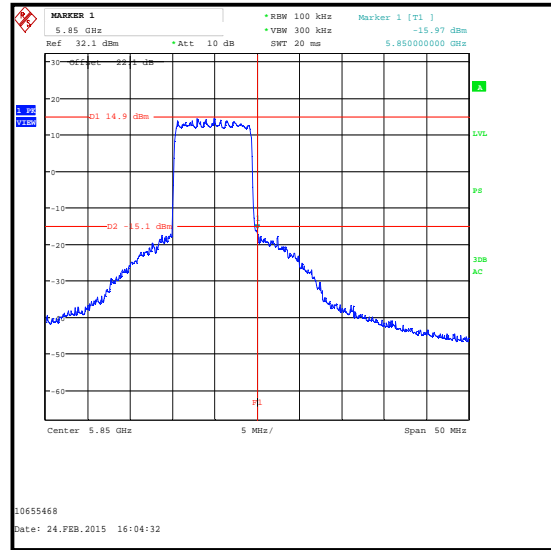
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / QPSK / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.359	-18.2	-16.0	2.2	Complied
5725	-18.1	-16.0	2.1	Complied
5850	-16.0	-15.1	0.9	Complied



Lower Band Edge Peak Measurement

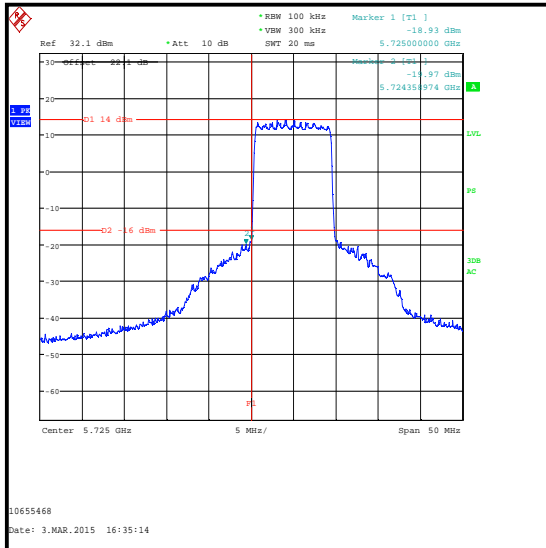


Upper Band Edge Peak Measurement

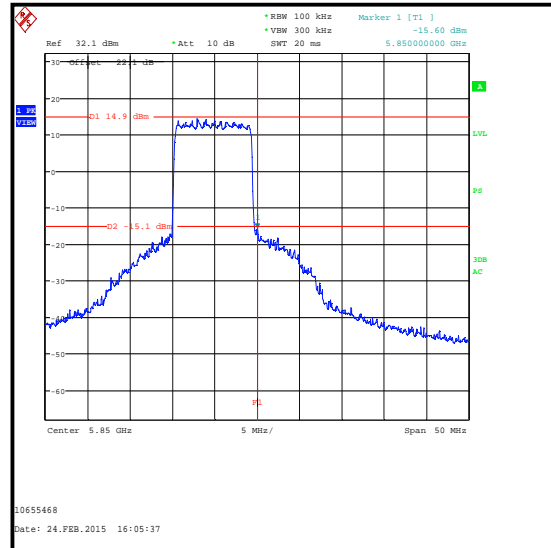
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / QPSK / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.359	-20.0	-16.0	4.0	Complied
5725	-18.9	-16.0	2.9	Complied
5850	-15.6	-15.1	0.5	Complied



Lower Band Edge Peak Measurement

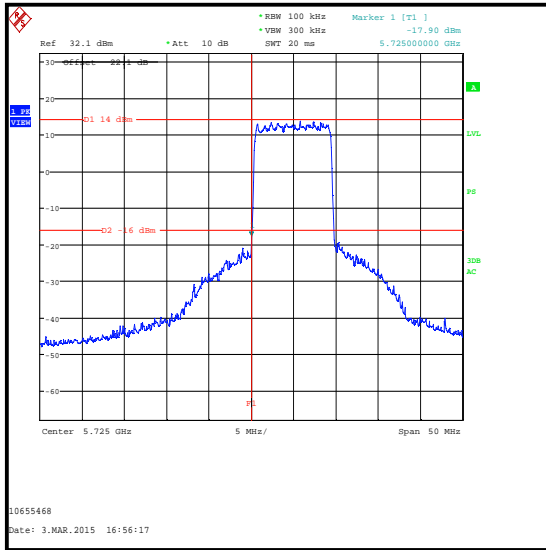


Upper Band Edge Peak Measurement

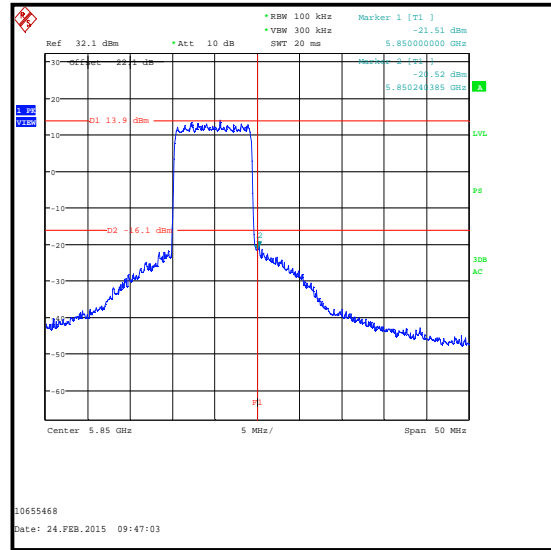
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / 16QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-17.9	-16.0	1.9	Complied
5850	-21.5	-16.1	5.4	Complied
5850.240	-20.5	-16.1	4.4	Complied



Lower Band Edge Peak Measurement

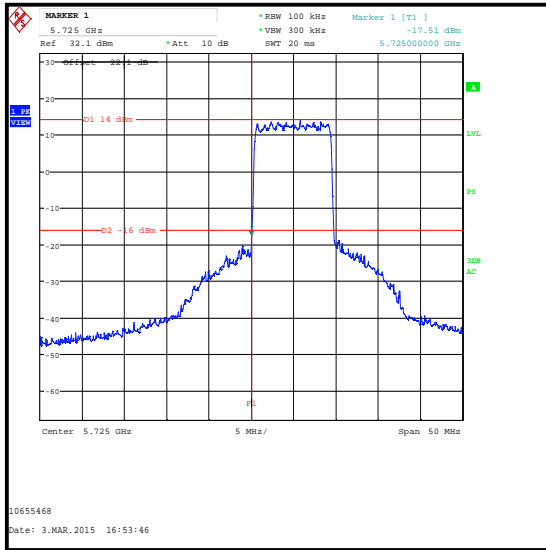


Upper Band Edge Peak Measurement

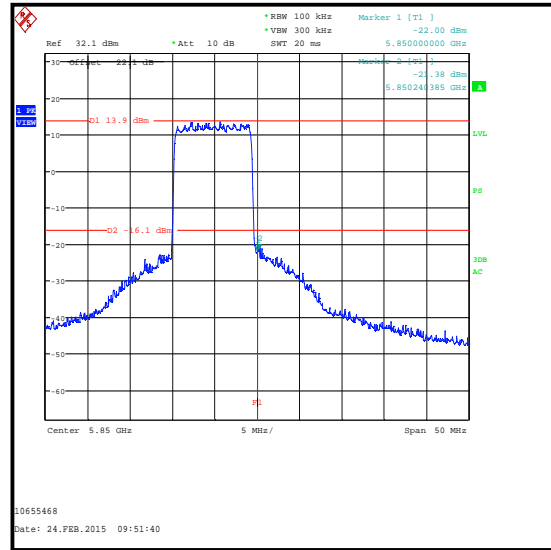
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / 16QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-17.5	-16.0	1.5	Complied
5850	-22.0	-16.1	5.9	Complied
5850.240	-21.4	-16.1	5.3	Complied



Lower Band Edge Peak Measurement

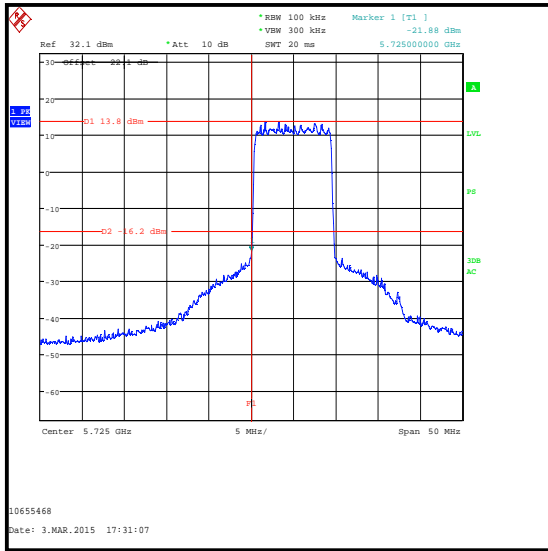


Upper Band Edge Peak Measurement

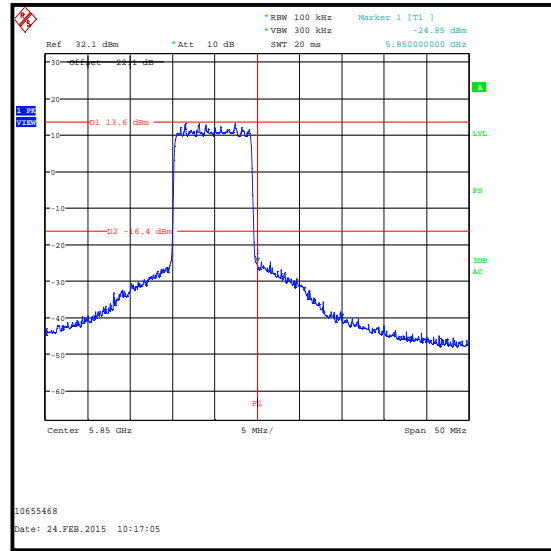
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / 64QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-21.9	-16.2	5.7	Complied
5850	-24.8	-16.4	8.4	Complied



Lower Band Edge Peak Measurement

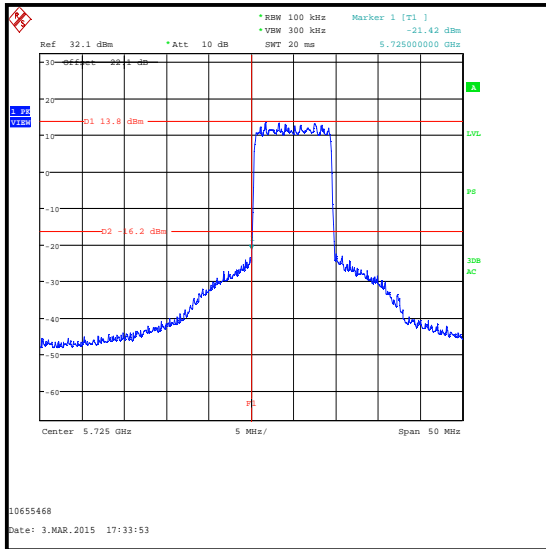


Upper Band Edge Peak Measurement

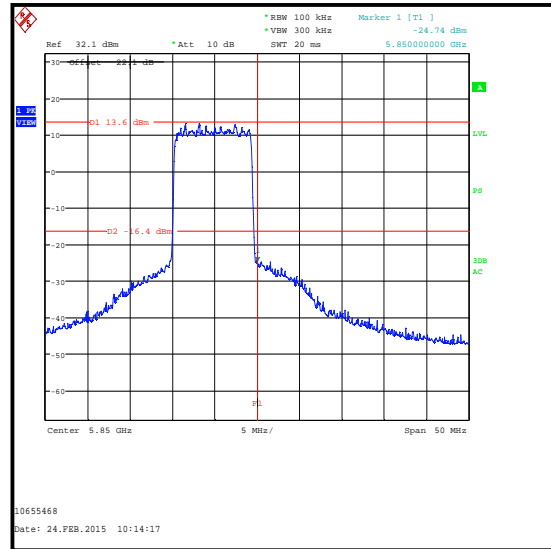
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / 64QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-21.4	-16.2	5.2	Complied
5850	-24.7	-16.4	8.3	Complied



Lower Band Edge Peak Measurement

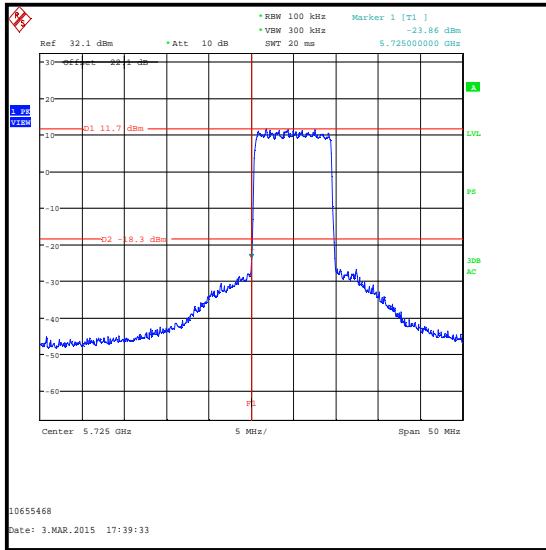


Upper Band Edge Peak Measurement

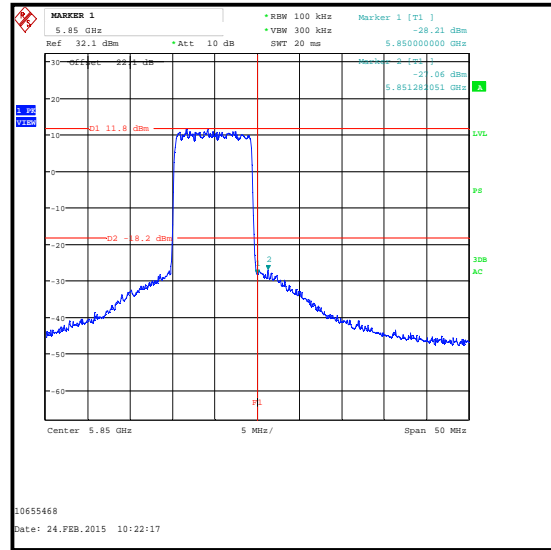
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / 256QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-23.9	-18.3	5.6	Complied
5850	-28.2	-18.2	10.0	Complied
5851.282	-27.1	-18.2	8.9	Complied



Lower Band Edge Peak Measurement

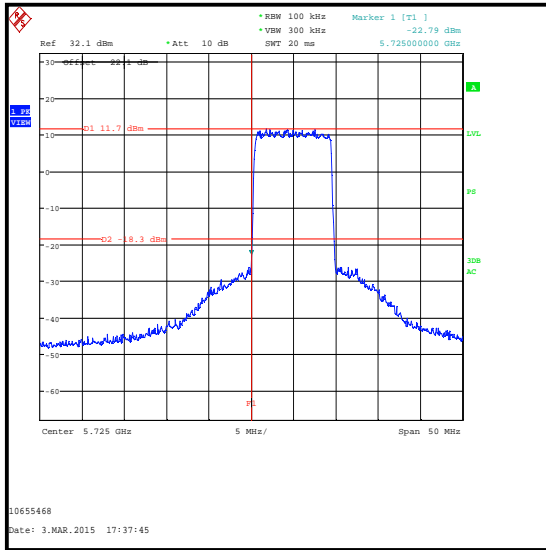


Upper Band Edge Peak Measurement

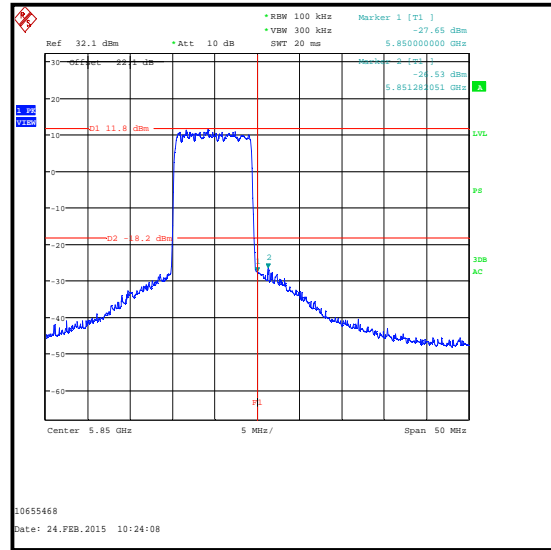
Band Edge Conducted Emissions (continued)

Results: 10 MHz Channel / 256QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-22.8	-18.3	4.5	Complied
5850	-27.6	-18.2	9.4	Complied
5851.282	-26.5	-18.2	8.3	Complied



Lower Band Edge Peak Measurement

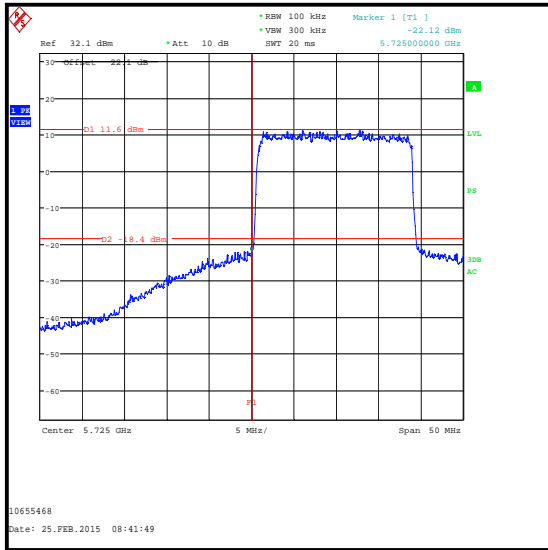


Upper Band Edge Peak Measurement

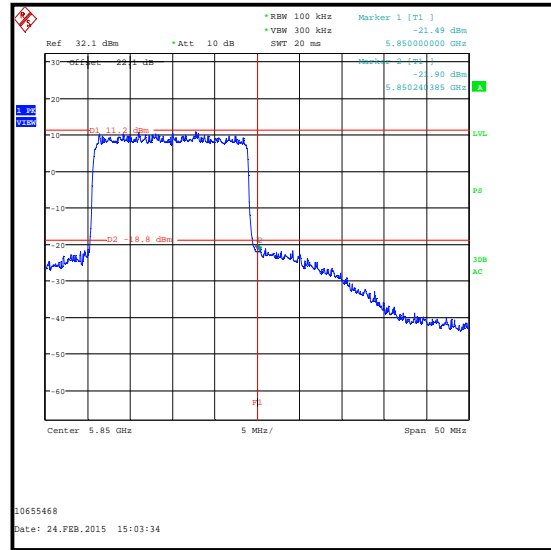
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / QPSK / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-22.1	-18.4	3.7	Complied
5850	-21.5	-18.8	2.7	Complied
5850.240	-21.9	-18.8	3.1	Complied



Lower Band Edge Peak Measurement

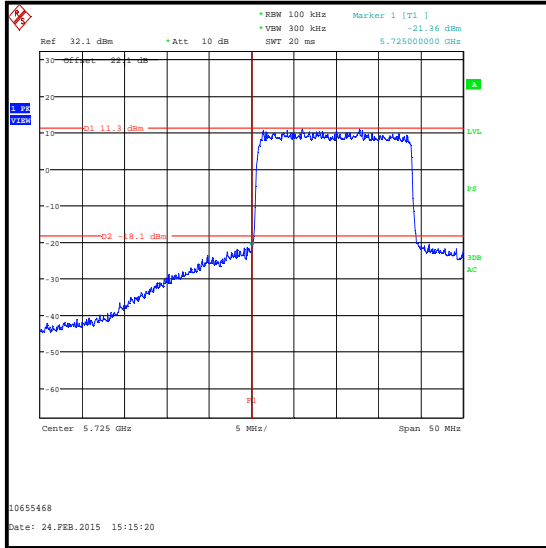


Upper Band Edge Peak Measurement

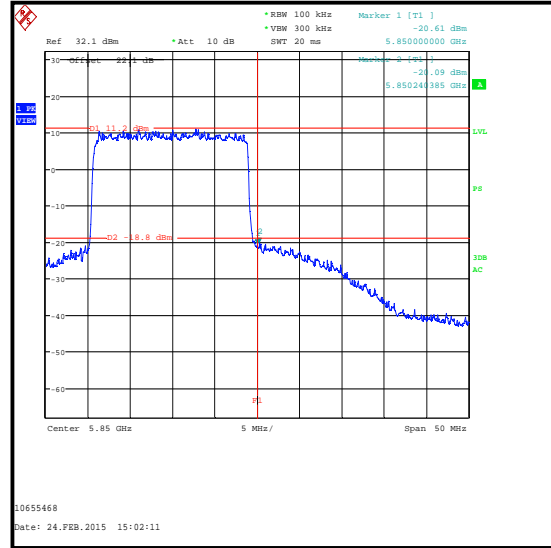
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / QPSK / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-21.4	-18.1	3.3	Complied
5850	-20.6	-18.8	1.8	Complied
5850.240	-20.1	-18.8	1.3	Complied



Lower Band Edge Peak Measurement

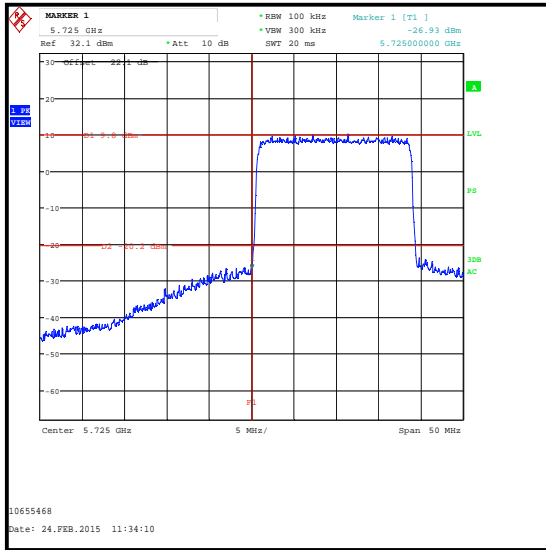


Upper Band Edge Peak Measurement

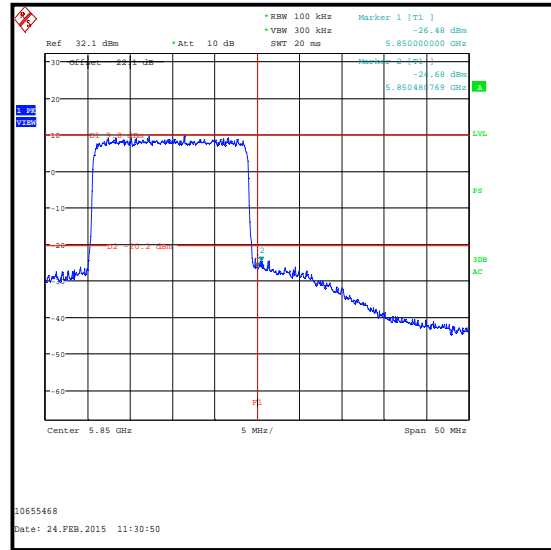
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / 16QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-26.9	-20.2	6.7	Complied
5850	-26.5	-20.2	6.3	Complied
5850.481	-24.7	-20.2	4.5	Complied



Lower Band Edge Peak Measurement

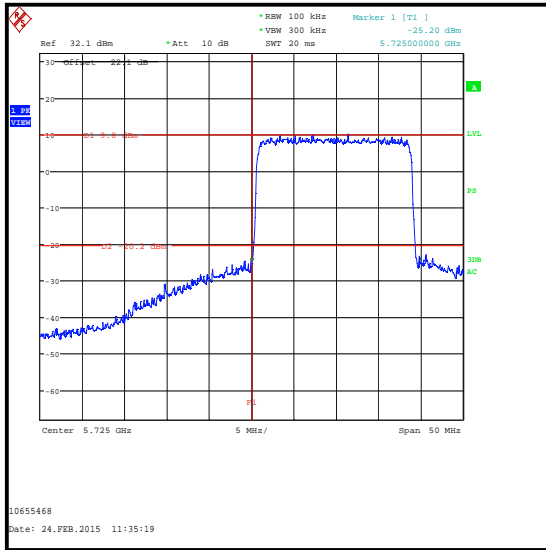


Upper Band Edge Peak Measurement

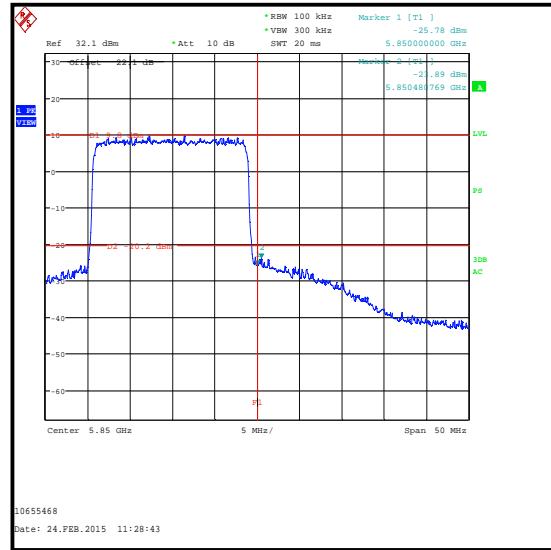
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / 16QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-25.2	-20.2	5.0	Complied
5850	-25.8	-20.2	5.6	Complied
5850.481	-23.9	-20.2	3.7	Complied



Lower Band Edge Peak Measurement

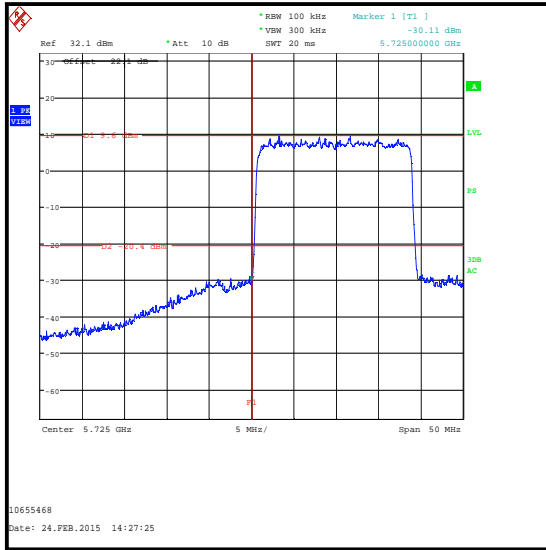


Upper Band Edge Peak Measurement

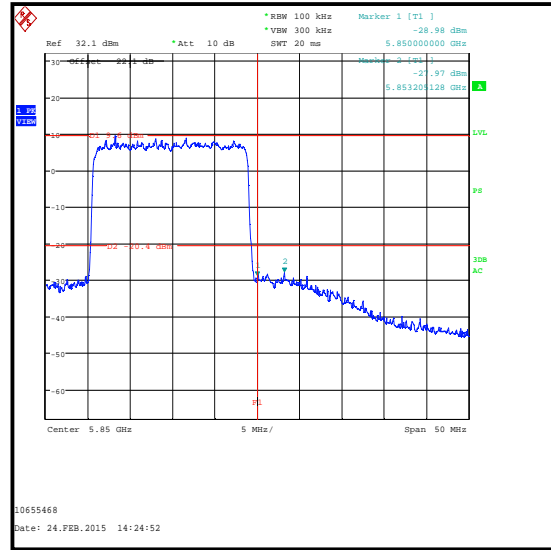
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / 64QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-30.1	-20.4	9.7	Complied
5850	-29.0	-20.4	8.6	Complied
5853.205	-28.0	-20.4	7.6	Complied



Lower Band Edge Peak Measurement

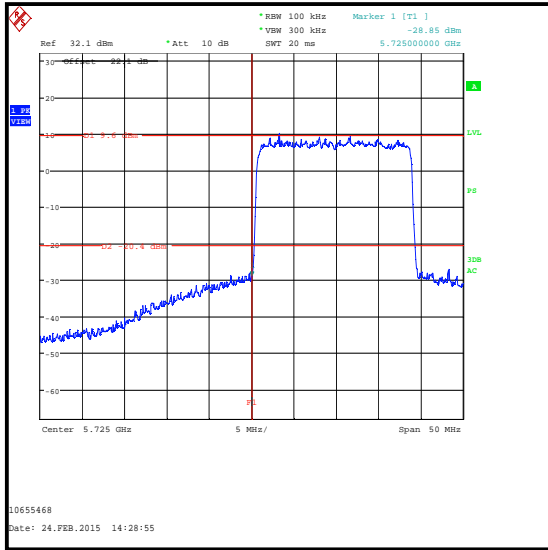


Upper Band Edge Peak Measurement

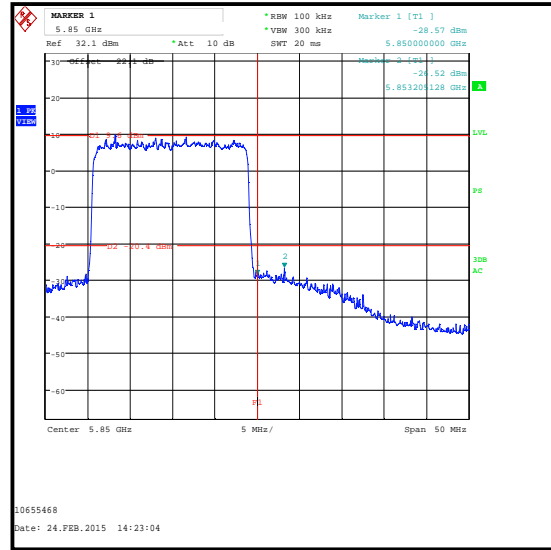
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / 64QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-28.8	-20.4	8.4	Complied
5850	-28.6	-20.4	8.2	Complied
5853.205	-26.5	-20.4	6.1	Complied



Lower Band Edge Peak Measurement

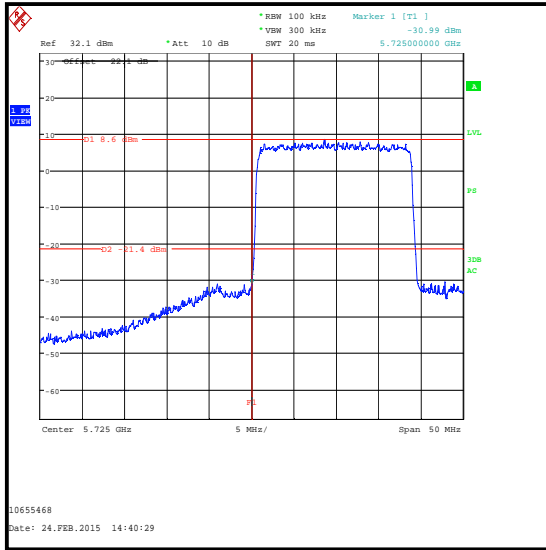


Upper Band Edge Peak Measurement

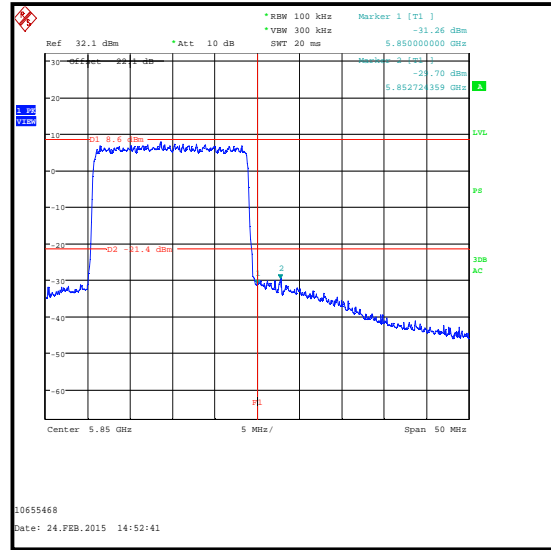
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / 256QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-31.0	-21.4	9.6	Complied
5850	-31.3	-21.4	9.9	Complied
5852.724	-29.7	-21.4	8.3	Complied



Lower Band Edge Peak Measurement

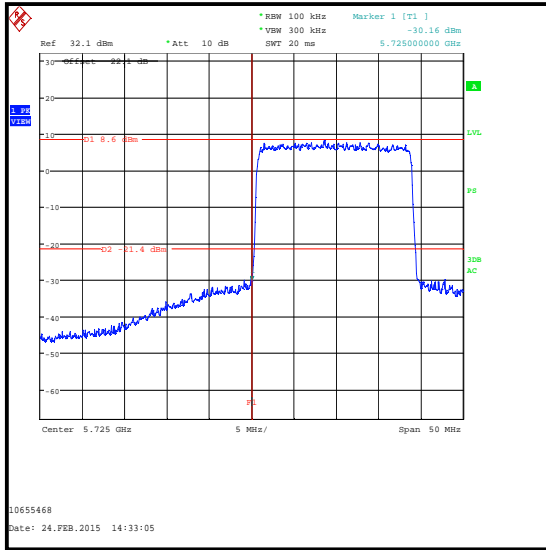


Upper Band Edge Peak Measurement

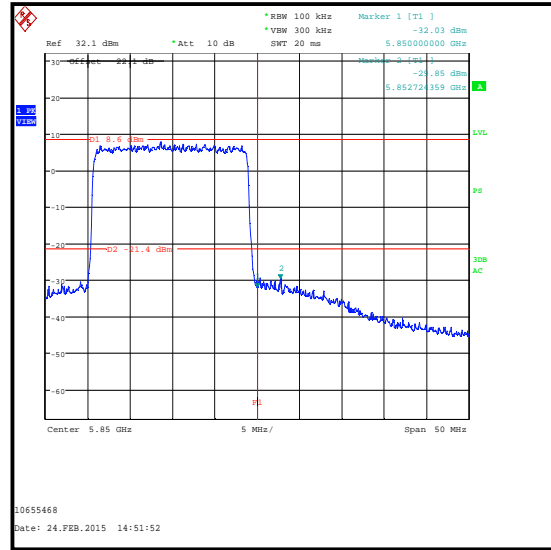
Band Edge Conducted Emissions (continued)

Results: 20 MHz Channel / 256QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-30.2	-21.4	8.8	Complied
5850	-32.0	-21.4	10.6	Complied
5852.724	-29.8	-21.4	8.4	Complied



Lower Band Edge Peak Measurement

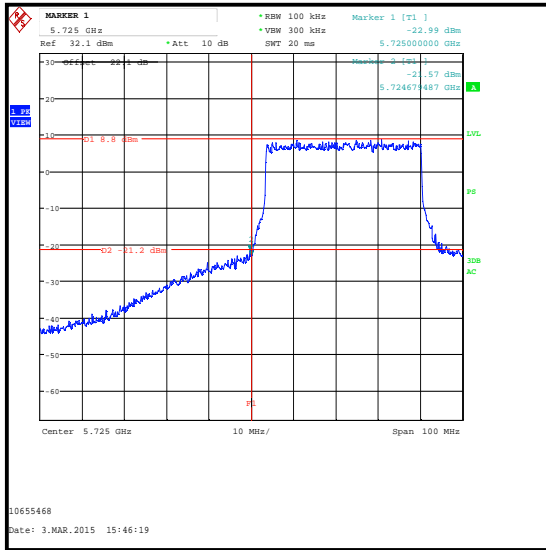


Upper Band Edge Peak Measurement

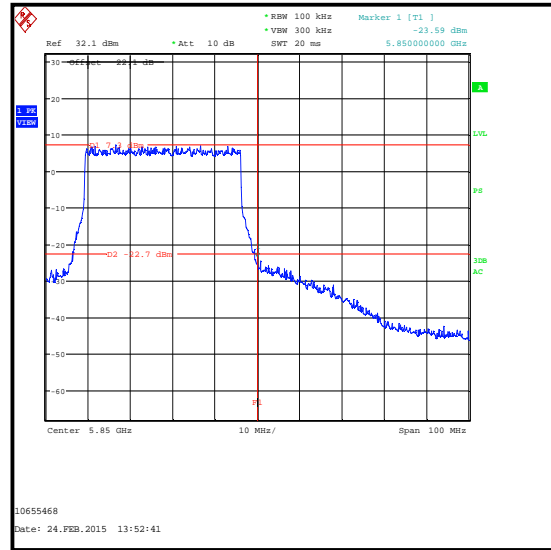
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / QPSK / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.679	-21.6	-21.2	0.4	Complied
5725	-23.0	-21.2	1.8	Complied
5850	-23.6	-22.7	0.9	Complied



Lower Band Edge Peak Measurement

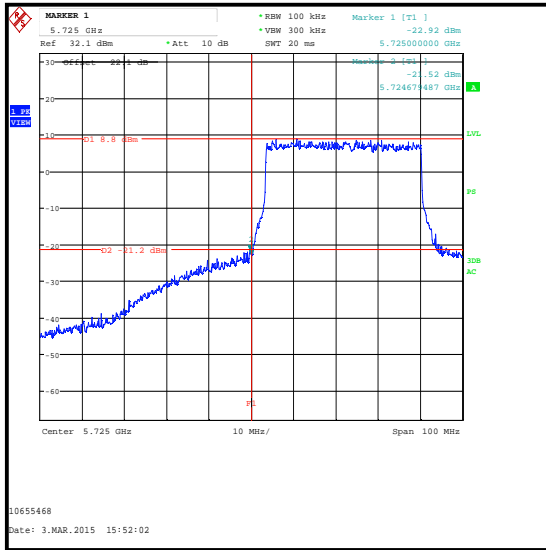


Upper Band Edge Peak Measurement

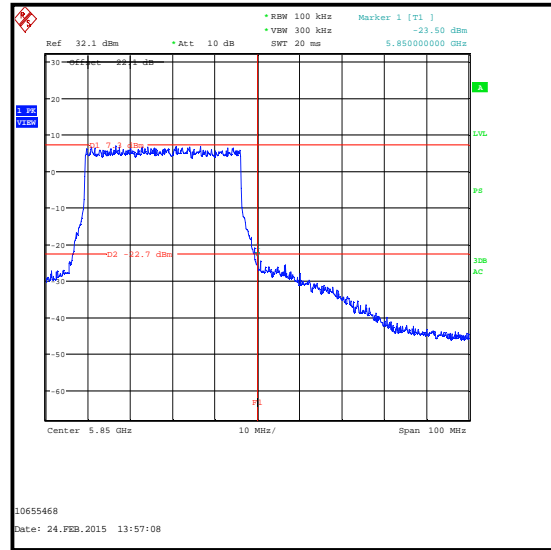
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / QPSK / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.679	-21.5	-21.2	0.3	Complied
5725	-22.9	-21.2	1.7	Complied
5850	-23.5	-22.7	0.8	Complied



Lower Band Edge Peak Measurement

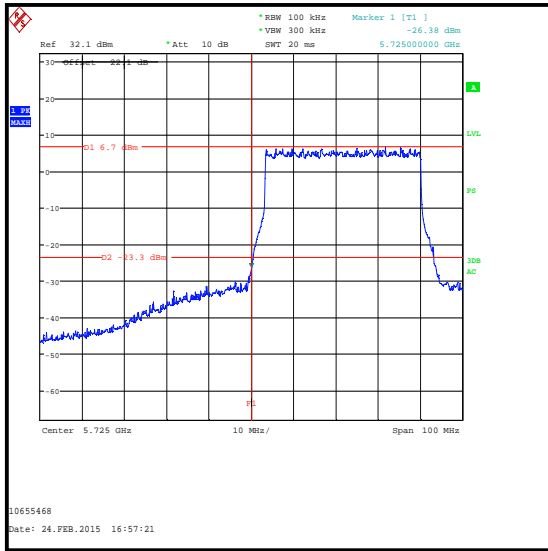


Upper Band Edge Peak Measurement

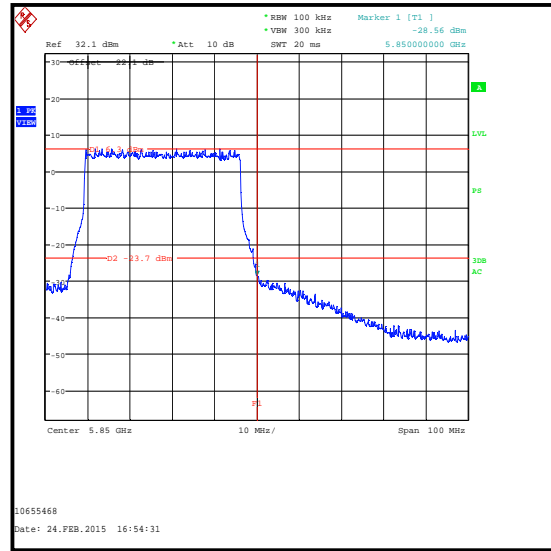
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / 16QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-26.4	-23.3	3.1	Complied
5850	-28.6	-23.7	4.9	Complied



Lower Band Edge Peak Measurement

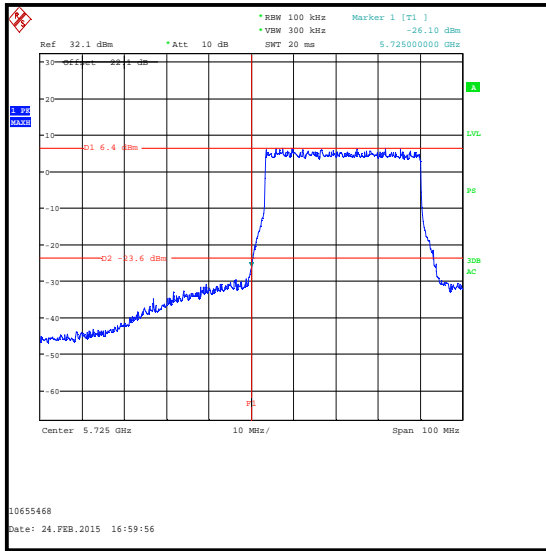


Upper Band Edge Peak Measurement

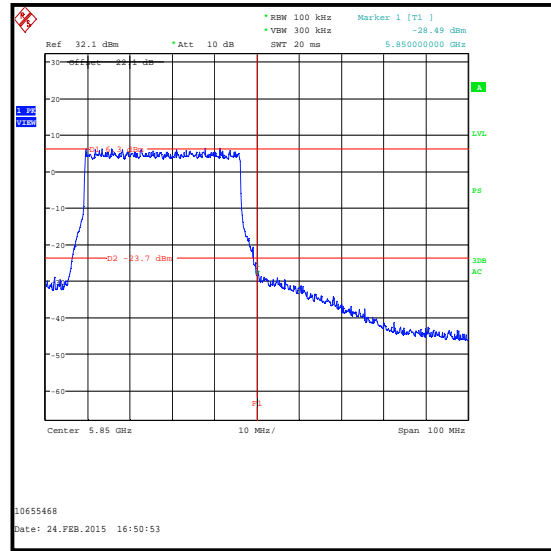
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / 16QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-26.1	-23.6	2.5	Complied
5850	-28.5	-23.7	4.8	Complied



Lower Band Edge Peak Measurement

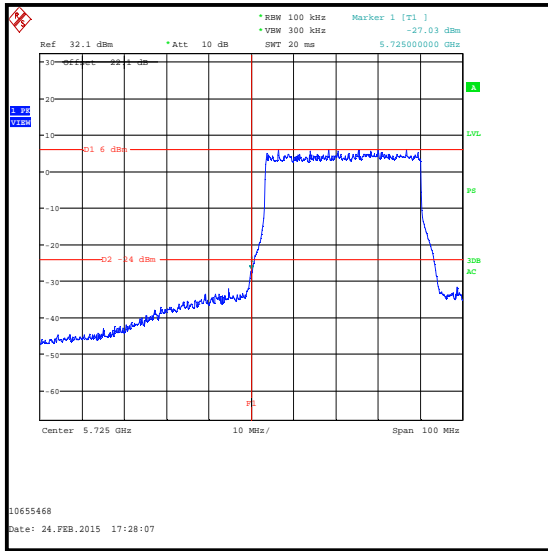


Upper Band Edge Peak Measurement

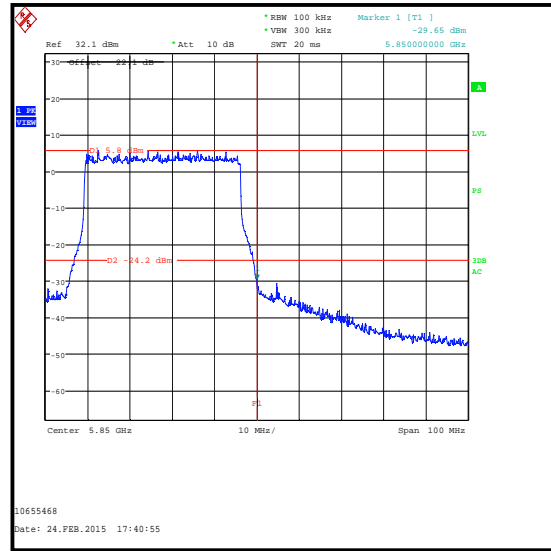
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / 64QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-27.0	-24.0	3.0	Complied
5850	-29.6	-24.2	5.4	Complied



Lower Band Edge Peak Measurement

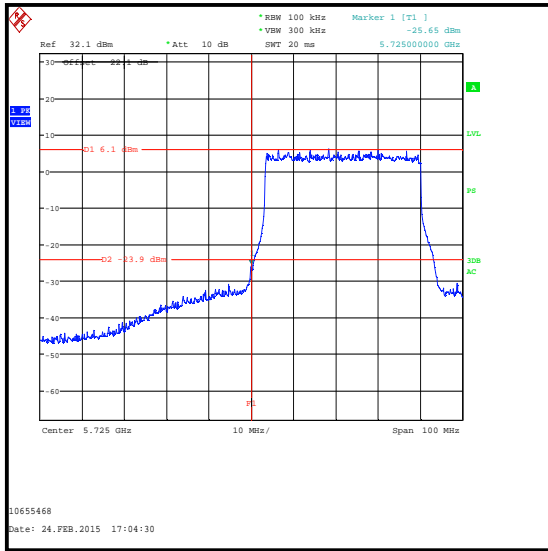


Upper Band Edge Peak Measurement

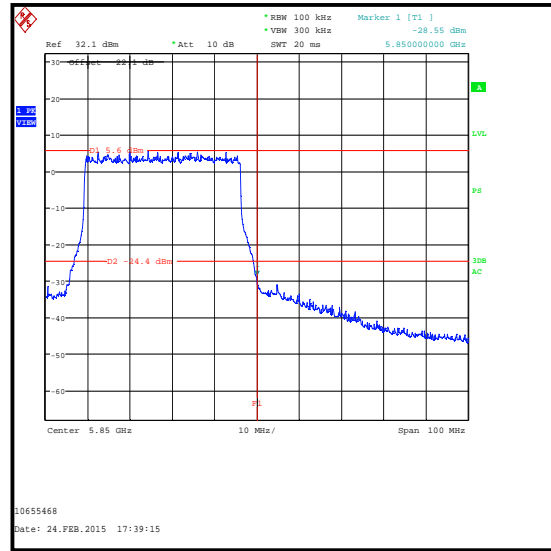
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / 64QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-25.6	-23.9	1.7	Complied
5850	-28.5	-24.4	4.1	Complied



Lower Band Edge Peak Measurement

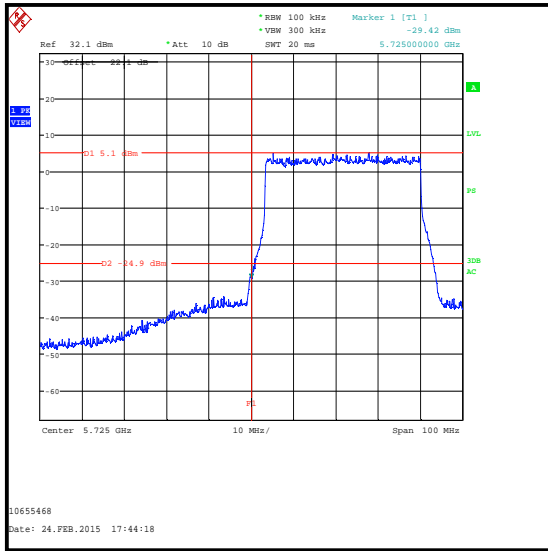


Upper Band Edge Peak Measurement

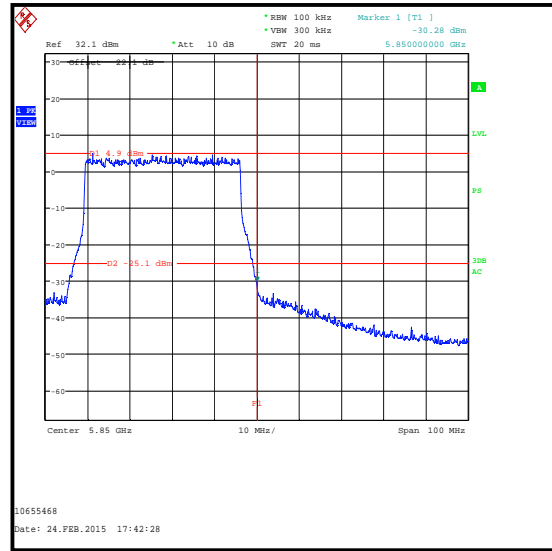
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / 256QAM / A Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-29.4	-24.9	4.5	Complied
5850	-30.3	-25.1	5.2	Complied



Lower Band Edge Peak Measurement

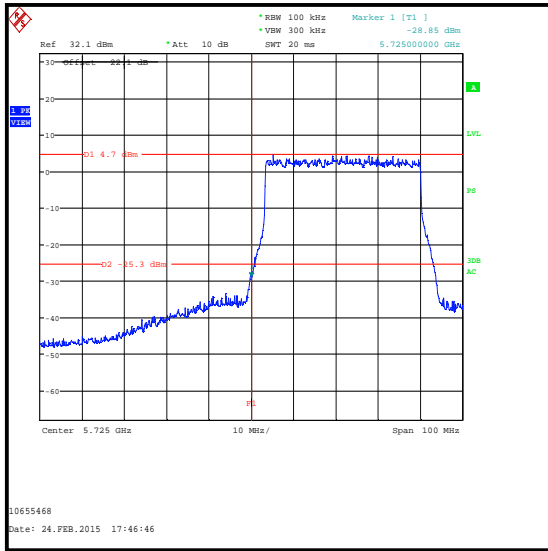


Upper Band Edge Peak Measurement

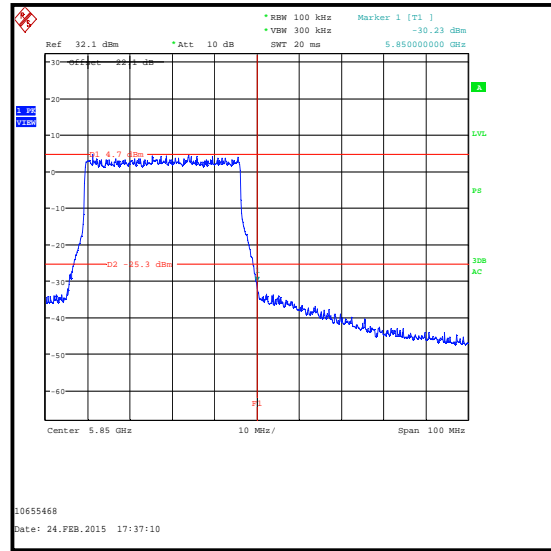
Band Edge Conducted Emissions (continued)

Results: 40 MHz Channel / 256QAM / B Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-28.8	-25.3	3.5	Complied
5850	-30.2	-25.3	4.9	Complied



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	Calibrated Before Use	N/A
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	09 May 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	24 Apr 2015	12
M1657	Thermohyrometer	JM Handelspunkt	30.5015.13	N/A	14 Mar 2015	12

5.2.6. Transmitter Radiated Emissions**Test Summary:**

Test Engineer:	David Doyle	Test Date:	09 March 2015
Test Sample Serial Number:	F50980BB0073		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Section 11 and 12 / ANSI C63.10-2009 Sections 6.3 and 6.5 referencing ANSI C63.4-2009
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

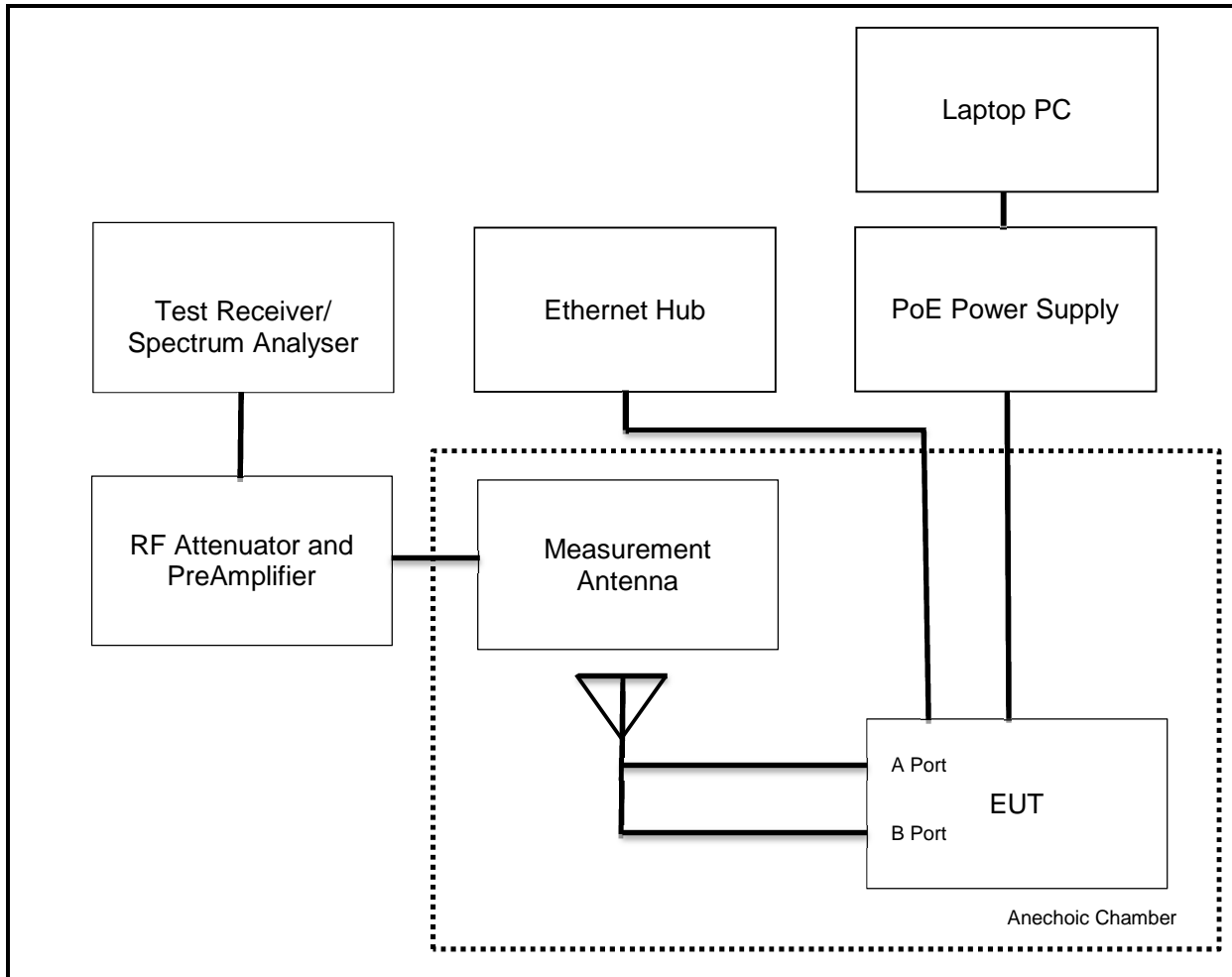
Temperature (°C):	21
Relative Humidity (%):	34

Note(s):

- All emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor. Therefore the highest level of noise floor has been recorded in the tables below.**
- The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss
- The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
- Measurements for the 6' parabolic antenna were performed using a 4' parabolic antenna and the difference in gain was incorporated into the measurement as an RF level offset.
- Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The centre point of the EUT system was placed at a height of 0.8 metres above the test chamber floor in the centre of the chamber turntable. The EUT was placed as close to 0.8 metres as the antenna bracket and RF cables allowed. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Radiated Emissions (continued)

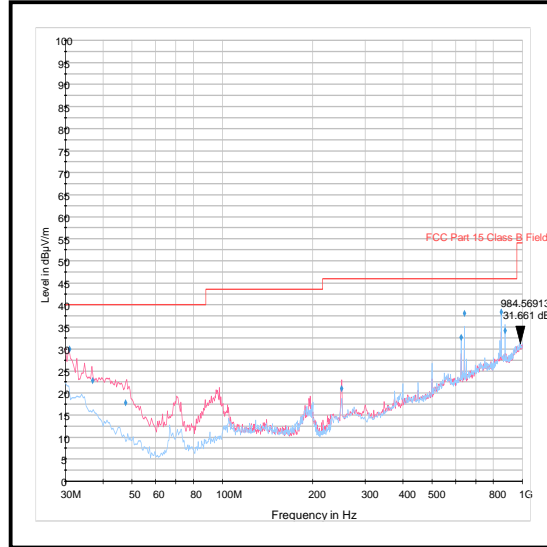
Test setup for radiated measurements:



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Plate Antenna

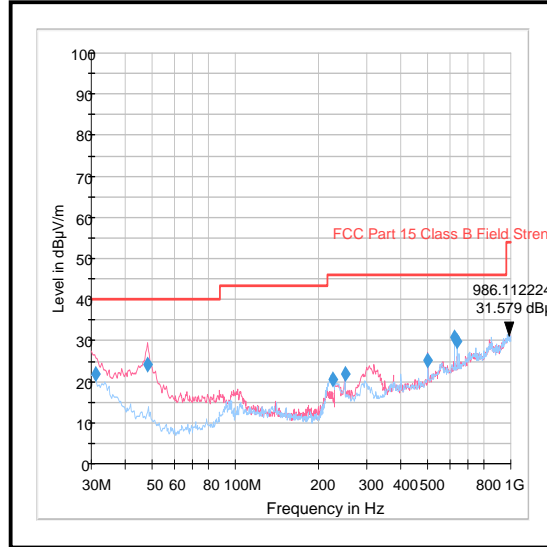
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
984.569	Horizontal	31.7	54.0	22.3	Complied



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna

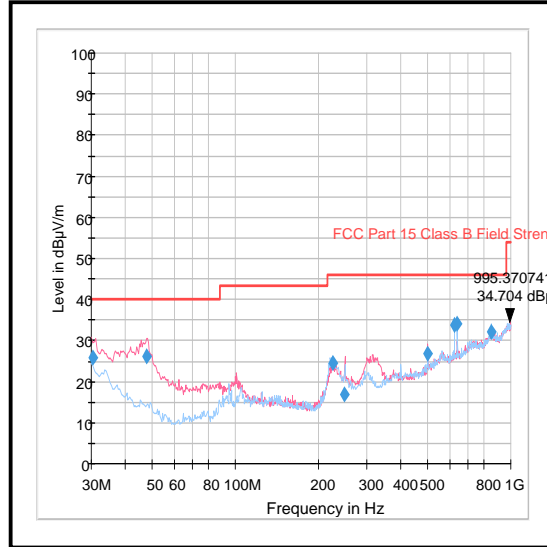
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
986.112	Horizontal	31.6	54.0	22.4	Complied



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna

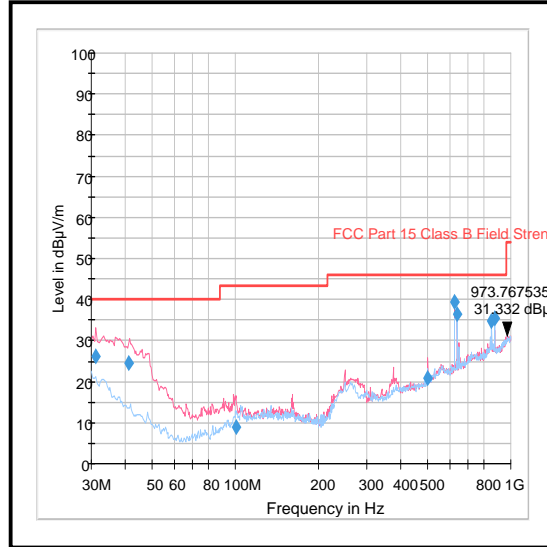
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
995.371	Horizontal	34.7	54.0	19.3	Complied



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna

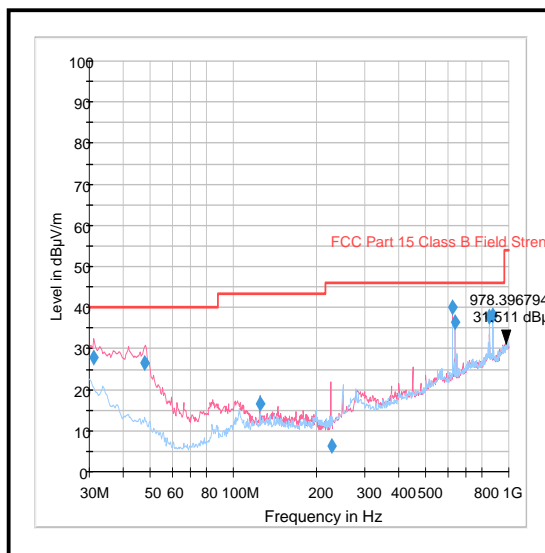
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
973.768	Horizontal	31.3	54.0	22.7	Complied



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
978.397	Horizontal	31.5	54.0	22.5	Complied



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1624	Thermohygrometer	JM Handelspunkt	30.5015.10	0	07 Jan 2016	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Mar 2015	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	08 Dec 2015	12
A490	Antenna	Chase	CBL6111A	1590	29 Apr 2015	12
G0543	Amplifier	Sonoma	310N	230801	05 Jun 2015	3
A1834	Attenuator	Hewlett Packard	8491B	10444	05 Mar 2016	12
A2131	Low Pass Filter	AtlanTecRF	AFL-02000	JFB1004-002	25 Apr 2015	12

Transmitter Radiated Emissions (continued)**Test Summary:**

Test Engineer:	David Doyle	Test Dates:	05 March 2015, 06 March 2015 & 10 March 2015
Test Sample Serial Number:	F50980BB0073		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Section 11 and 12 / ANSI C63.10-2009 Sections 6.3 and 6.5 referencing ANSI C63.4-2009
Frequency Range	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	21 to 22
Relative Humidity (%):	33 to 36

Note(s):

1. Radiated spurious emissions testing was performed with the EUT transmitting at maximum power on a 5 MHz channel with QPSK modulation. This configuration produced the highest emission levels and was therefore deemed to be worst case. The EUT was transmitting at 100% duty cycle.
2. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
3. The reference levels for emissions in non-restricted bands was established by following KDB 558074 D01 Section 11.2 procedure.
4. Appropriate RF filters and attenuators were used during pre-scans and final measurements. Insertion losses were entered on the spectrum analyser as RF levels offsets.
5. Measurements for the 6' parabolic antenna were performed using a 4' parabolic antenna and the difference in gain was incorporated into the measurement as an RF level offset.
6. *-30 dBc limit applies in non-restricted bands as the conducted output power and spectral density test were performed using an average detector.
7. Emissions in restricted bands; Where peak-detected amplitude was shown to comply with average limits, an average measurement was not performed.
8. Pre-scans above 1 GHz were performed in a fully anechoic chamber (UL Asset Number K0002) at a distance of 3 metres. The centre point of the EUT antenna was placed at a height of 0.8 metres above the test chamber floor in the centre of the chamber turntable. The EUT was placed as close to 0.8 metres as the antenna bracket and RF cables allowed. All measurement antennas were placed at a fixed height of 0.8 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (UL Asset Number K0001) at a distance of 3 metres. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Radiated Emissions (continued)**Results: Bottom Channel / QPSK / Peak / Plate Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
11457.692	Horizontal	40.6	74.0	33.4	Complied
17189.087	Horizontal	55.6	74.0	18.4	Complied

Results: Bottom Channel / QPSK / Average / Plate Antenna

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
17189.920	Horizontal	42.7	54.0	11.3	Complied

Results: Middle Channel / QPSK / Peak / Plate Antenna

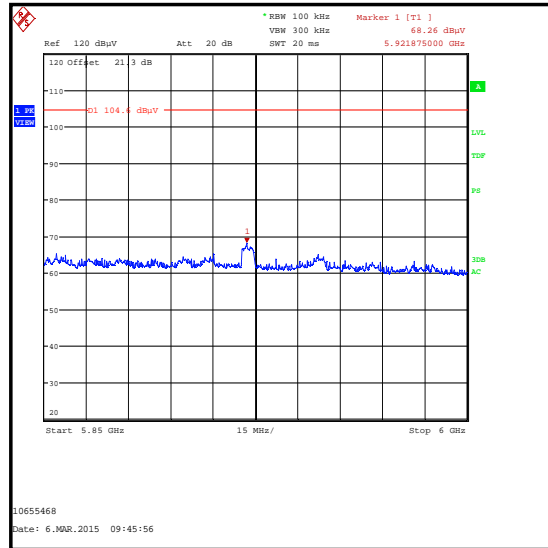
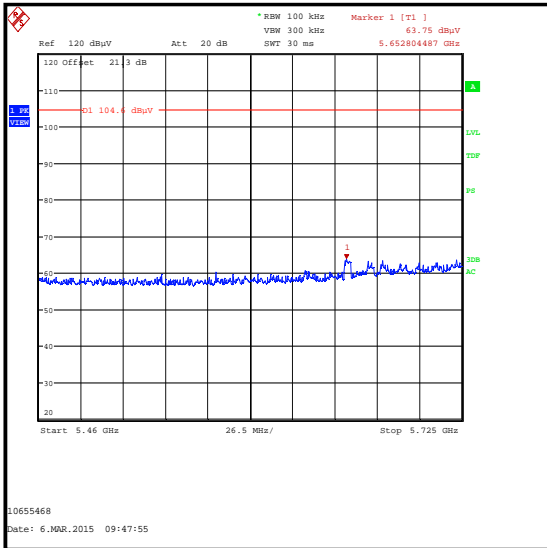
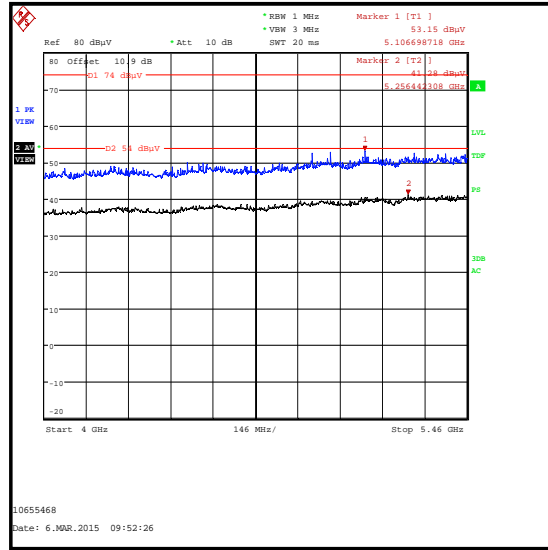
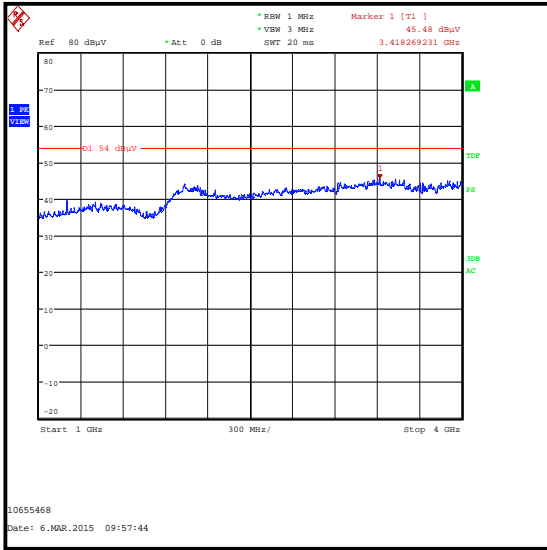
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11577.403	Horizontal	44.6	54.0	9.4	Complied

Results: Top Channel / QPSK / Peak / Plate Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11689.679	Horizontal	47.3	54.0	6.7	Complied

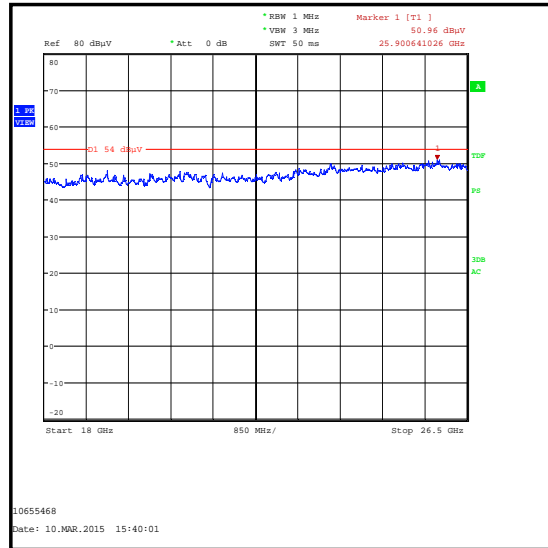
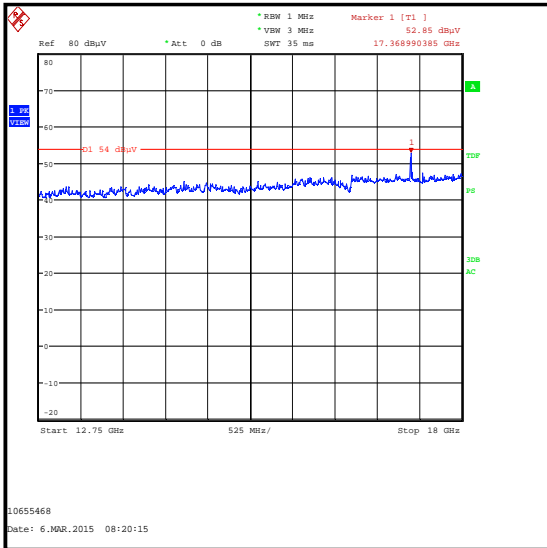
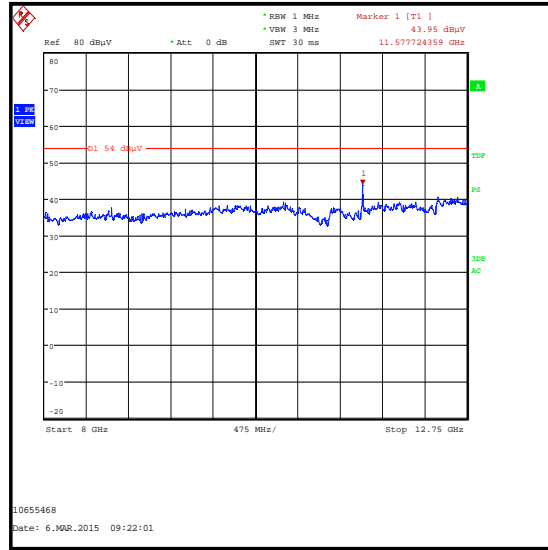
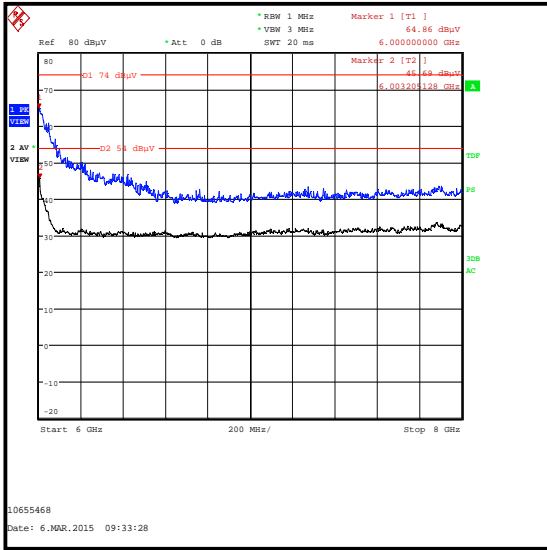
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Plate Antenna



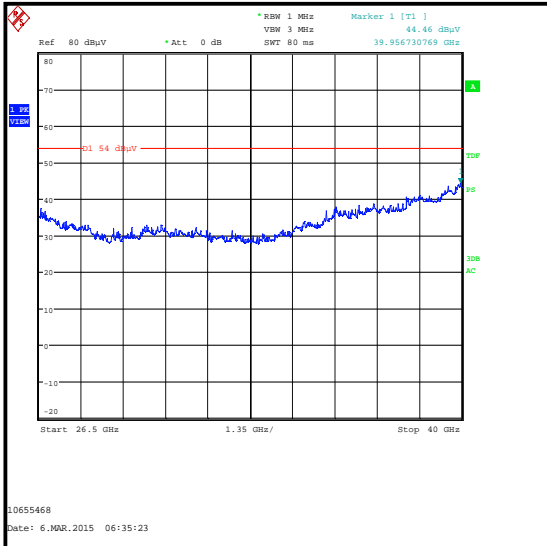
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Plate Antenna



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Plate Antenna



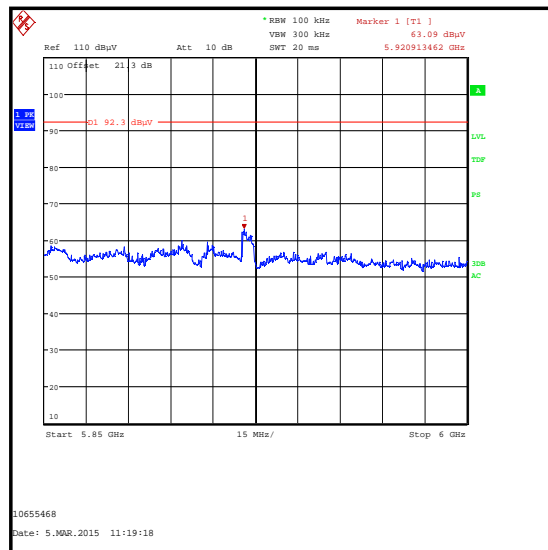
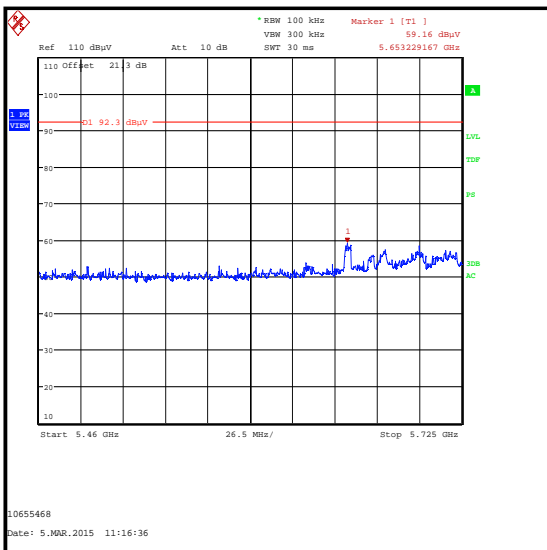
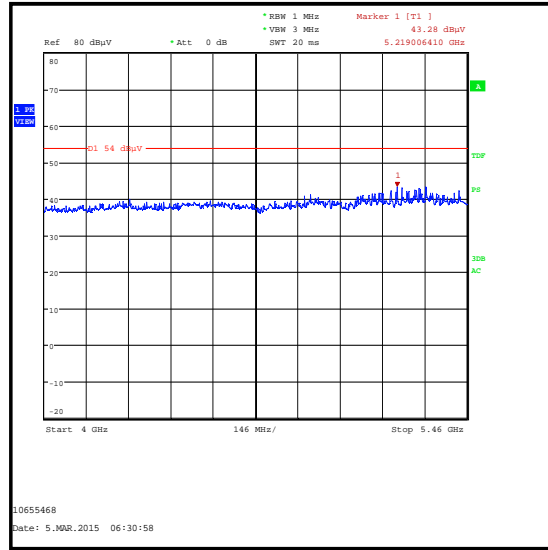
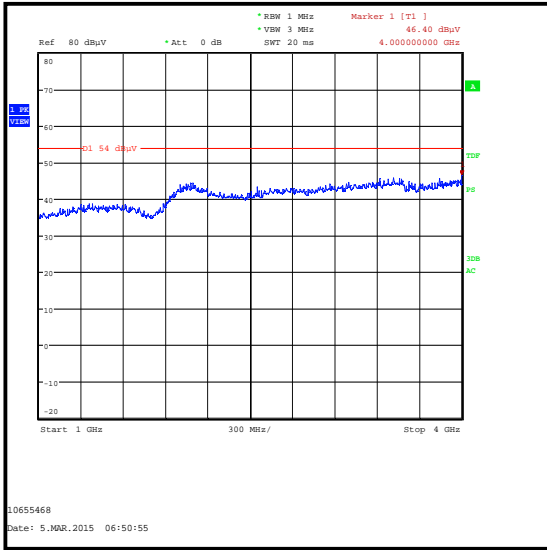
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (continued)**Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna**

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
6000.000	Vertical	58.9	74.0	15.1	Complied

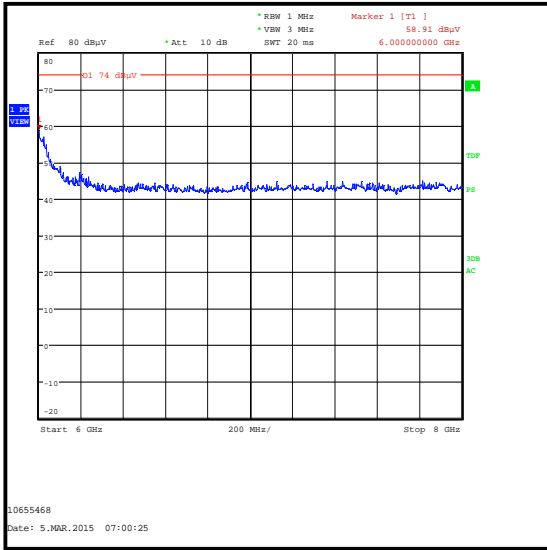
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna

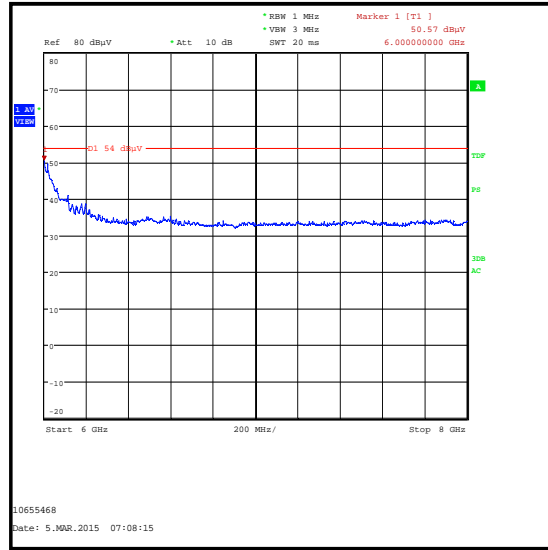


Transmitter Radiated Emissions (continued)

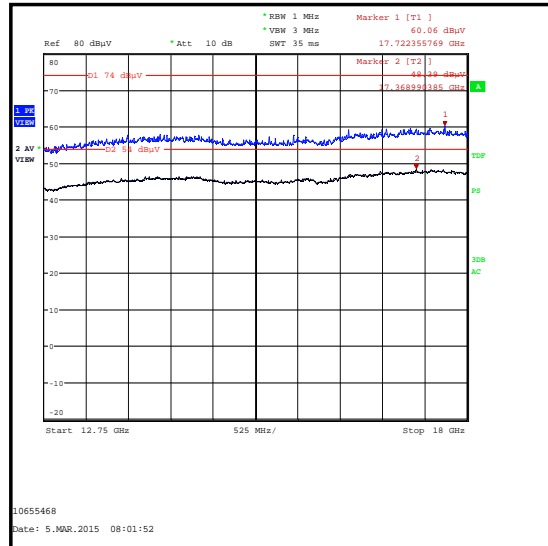
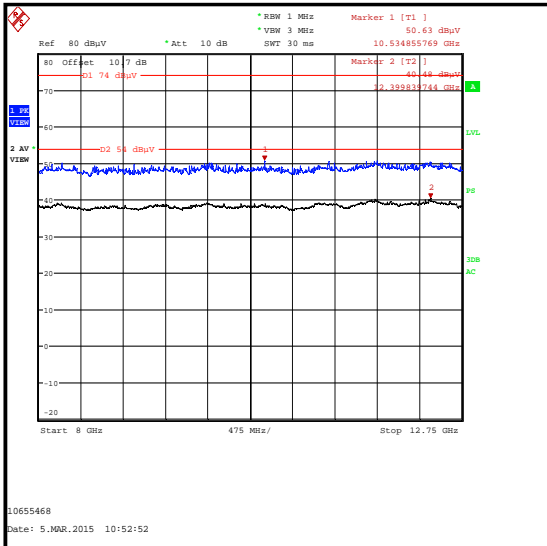
Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna



Peak Detector

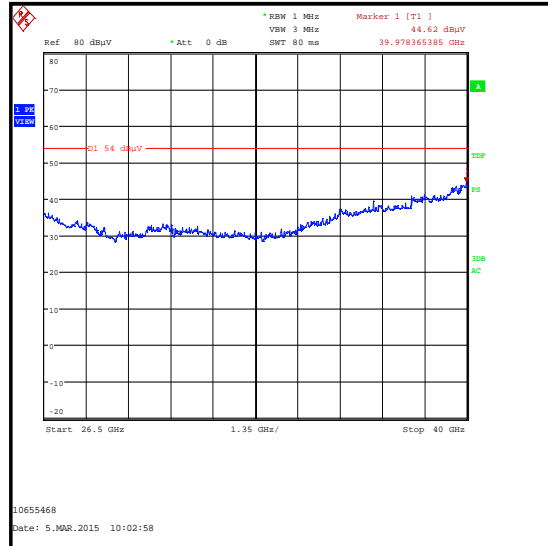
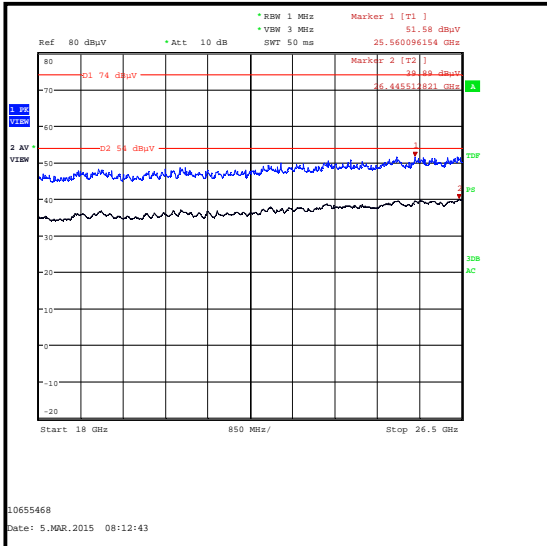


Average Detector



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna



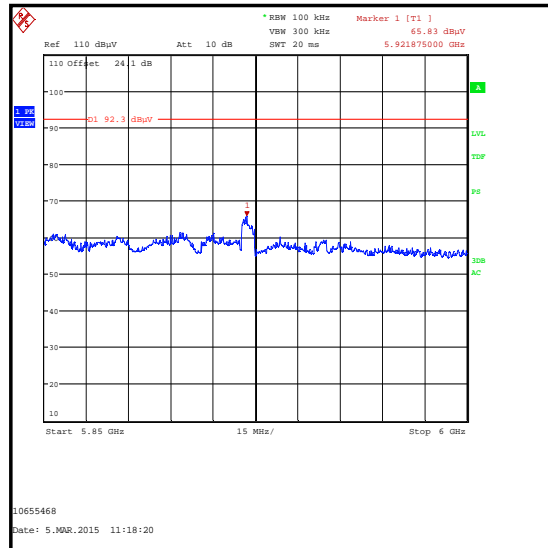
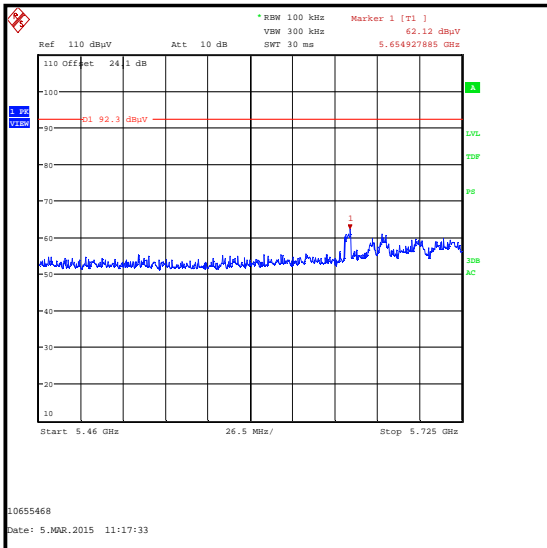
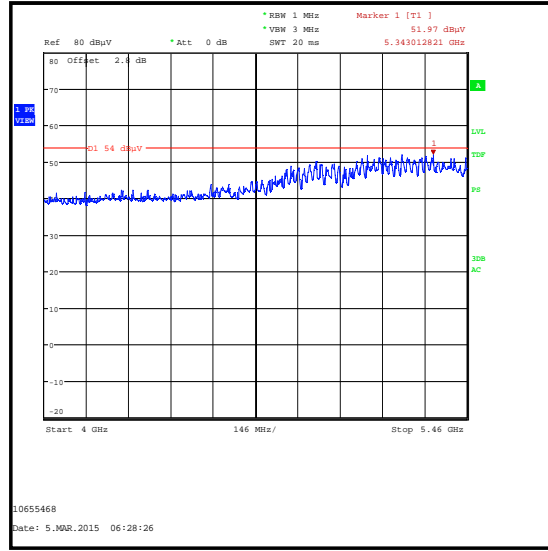
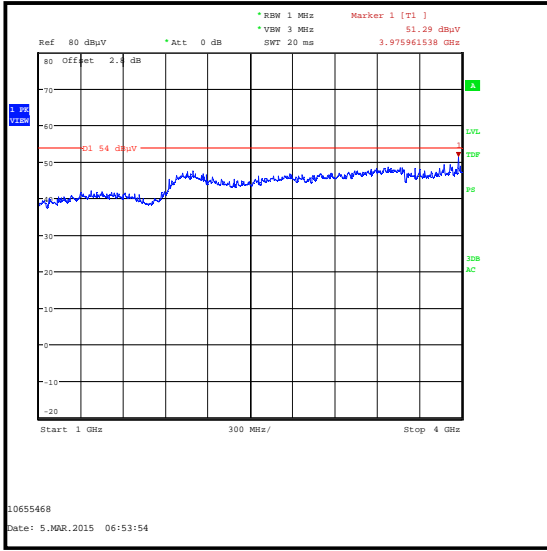
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna

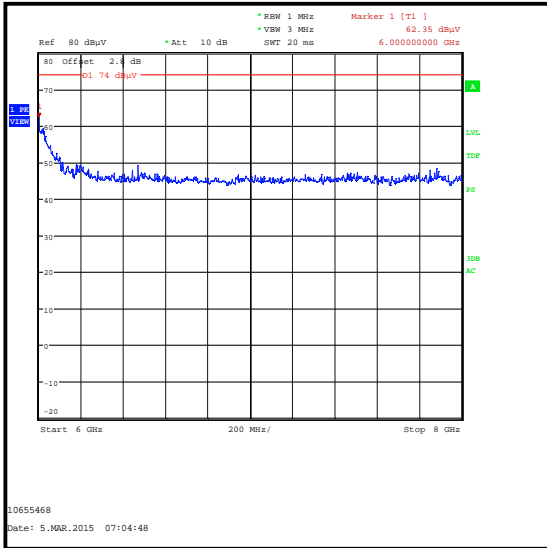
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
6000.000	Vertical	62.4	74.0	11.6	Complied

Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna

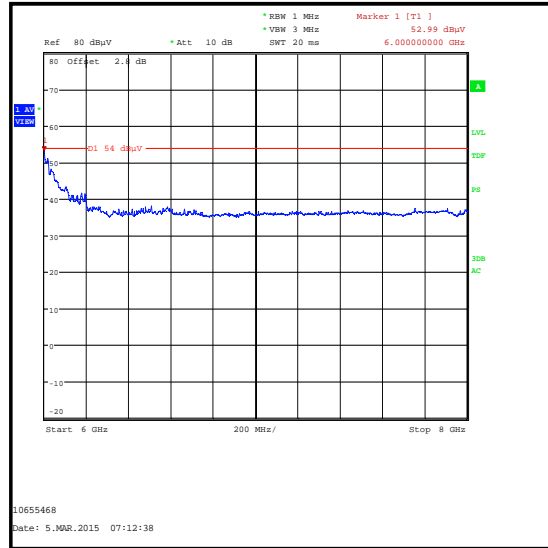


Transmitter Radiated Emissions (continued)

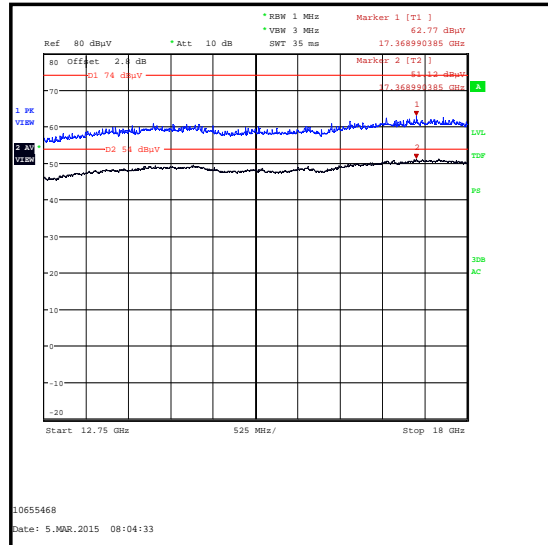
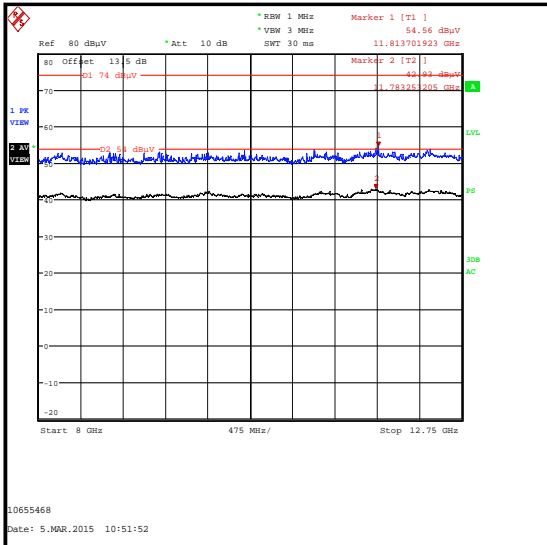
Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna



Peak Detector

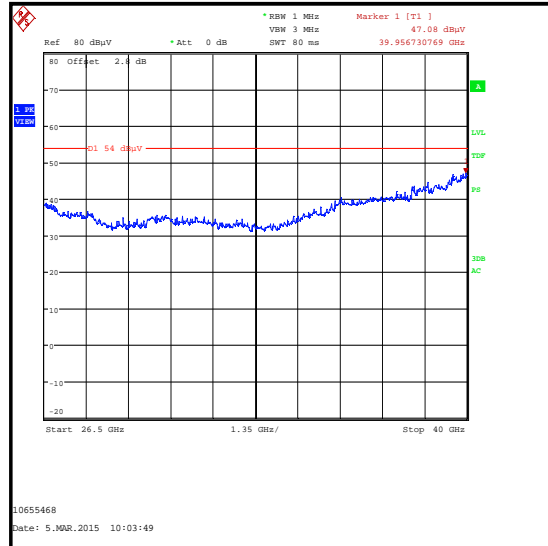
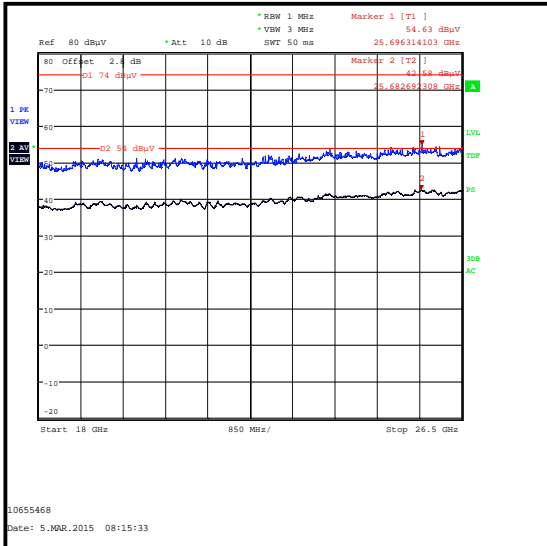


Average Detector



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna



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

Transmitter Radiated Emissions (continued)**Results: Bottom Channel / QPSK / Peak / 60° Sectorised Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11457.750	Horizontal	44.8	54.0	9.2	Complied

Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna

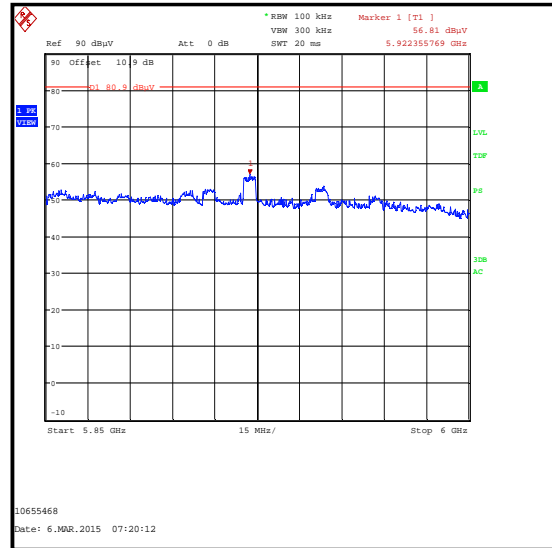
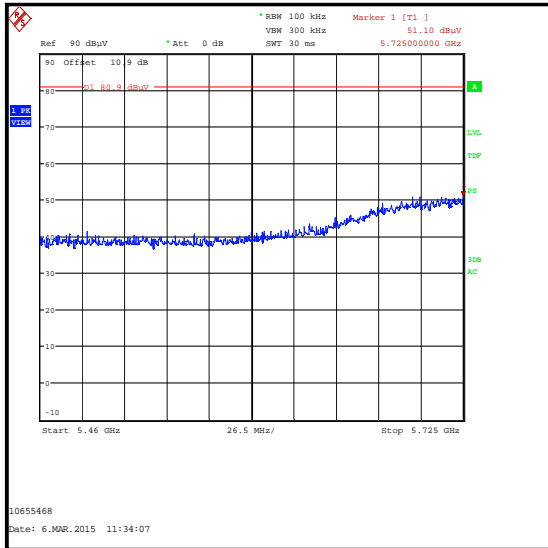
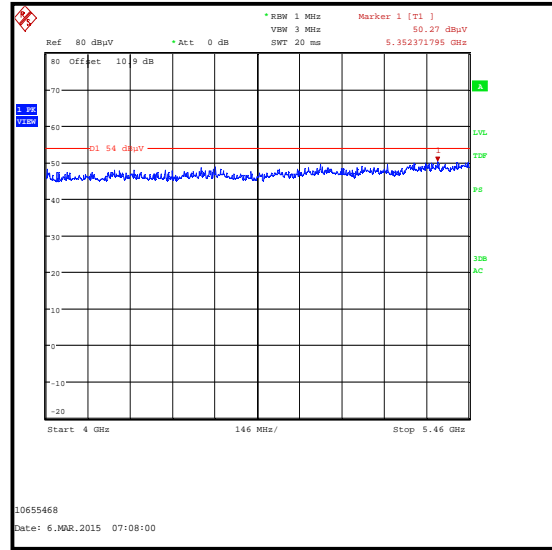
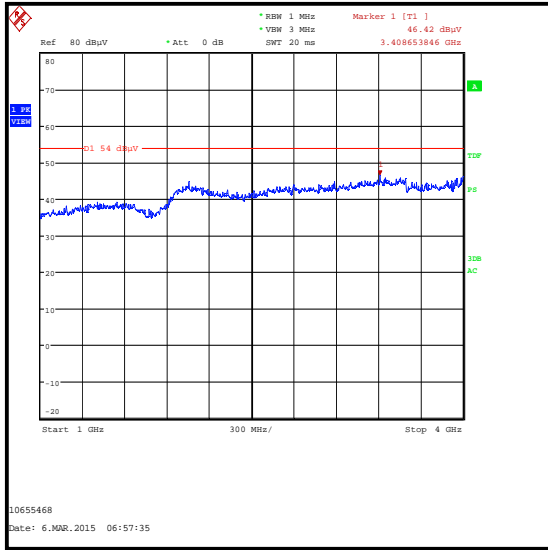
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11578.965	Horizontal	52.4	54.0	1.6	Complied

Results: Top Channel / QPSK / Peak / 60° Sectorised Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11689.766	Horizontal	53.2	54.0	0.8	Complied

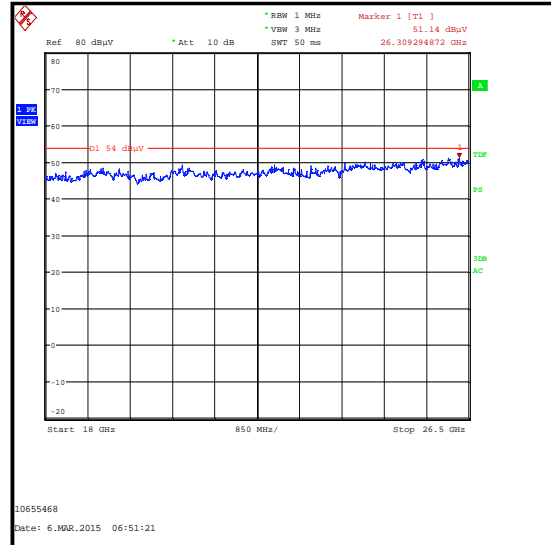
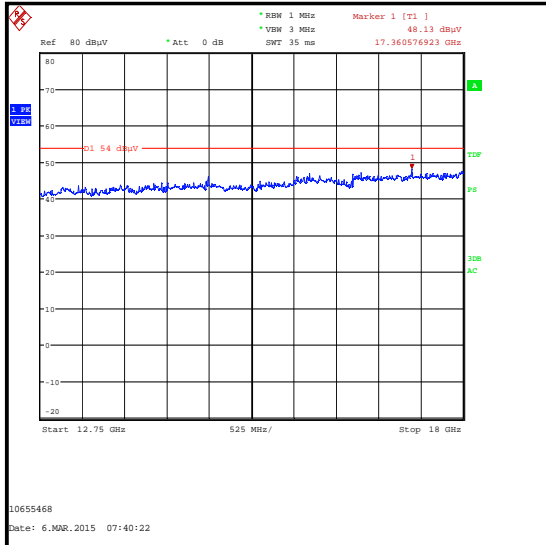
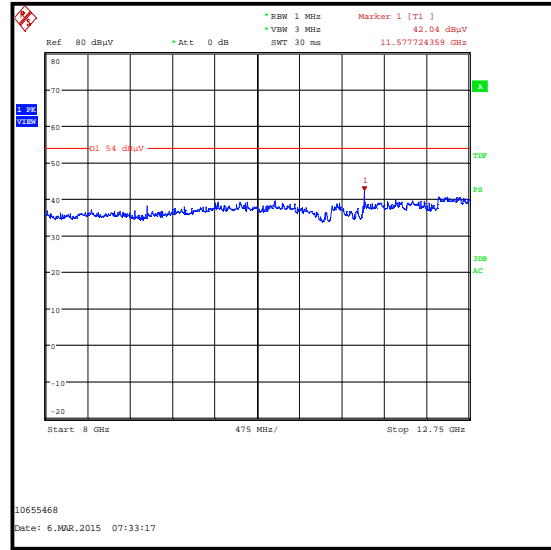
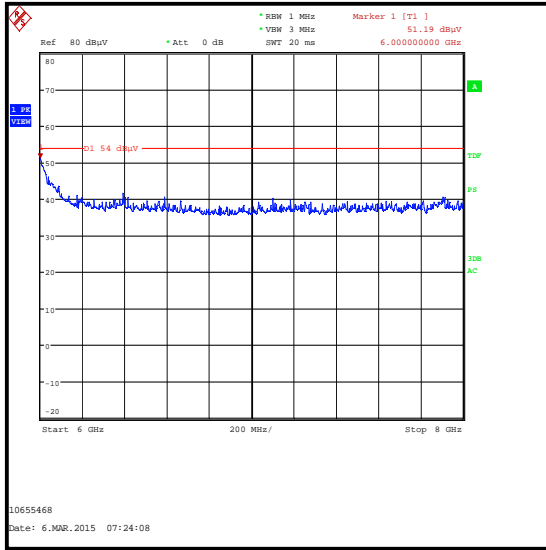
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna



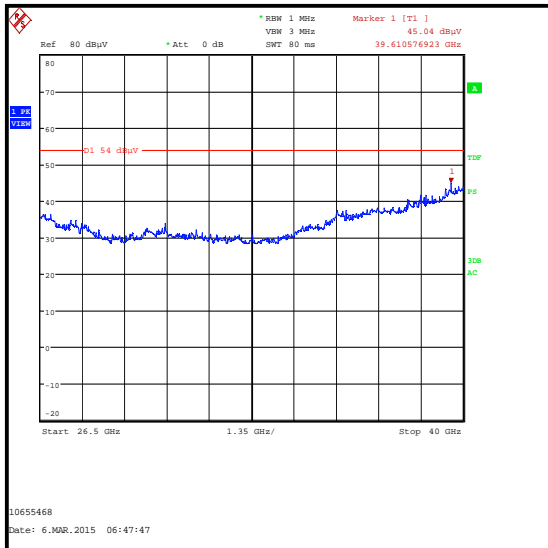
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna



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

Transmitter Radiated Emissions (continued)**Results: Bottom Channel / QPSK / Peak / Omnidirectional Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11459.083	Horizontal	42.6	54.0	11.4	Complied

Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna

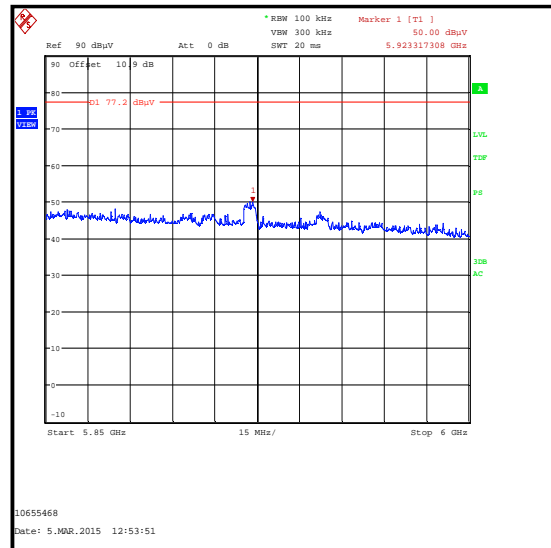
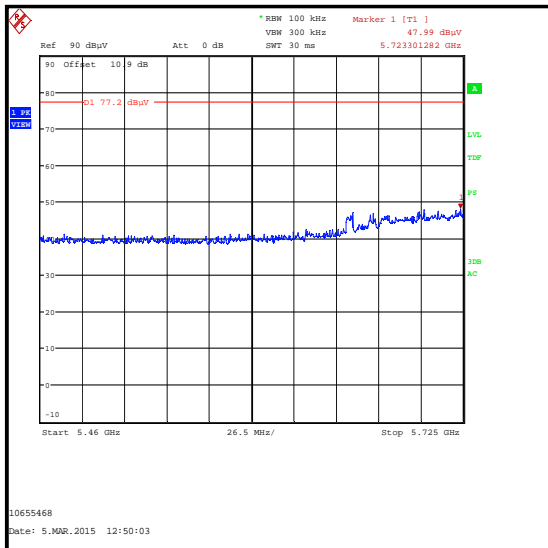
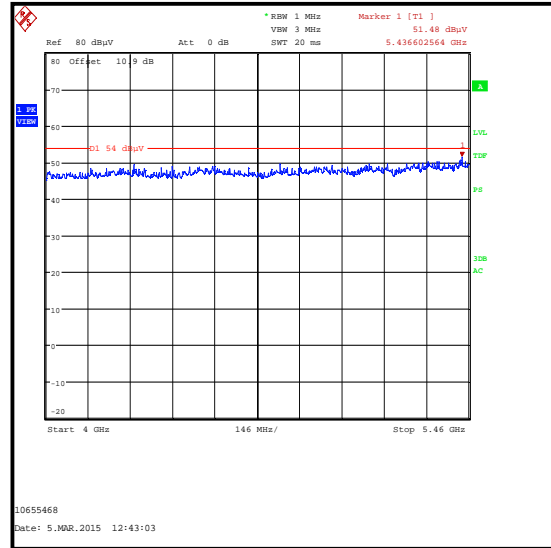
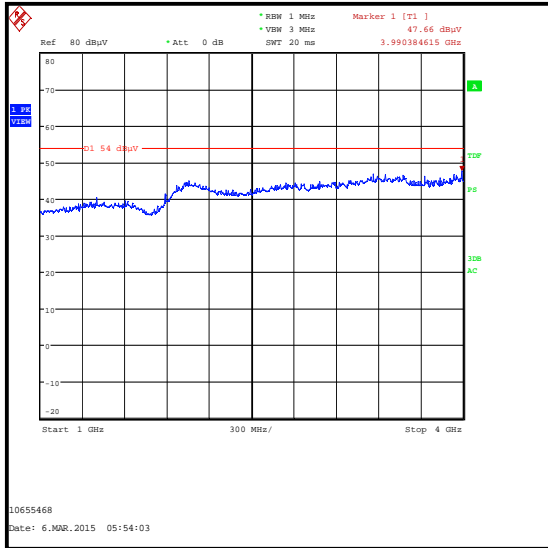
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11576.907	Horizontal	47.9	54.0	6.1	Complied

Results: Top Channel / QPSK / Peak / Omnidirectional Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
11691.917	Horizontal	45.3	54.0	8.7	Complied

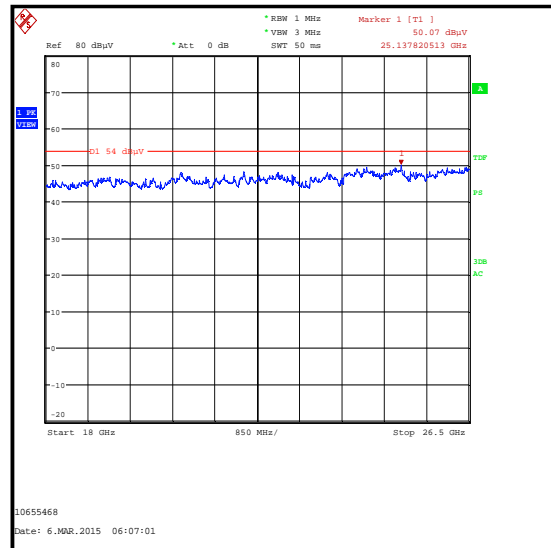
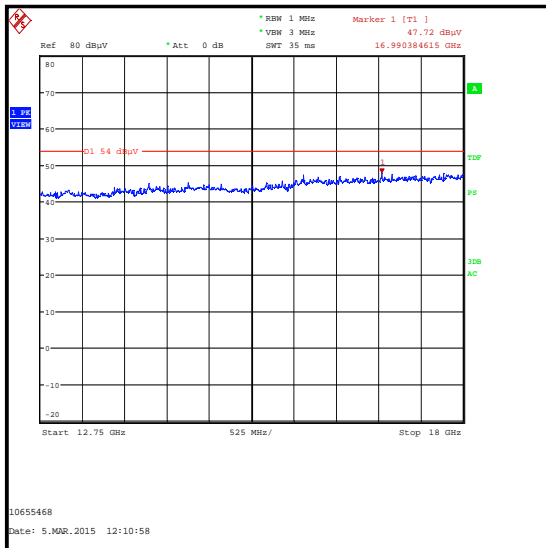
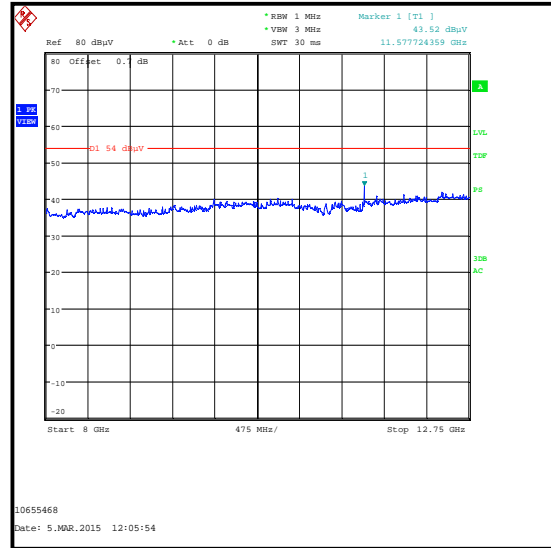
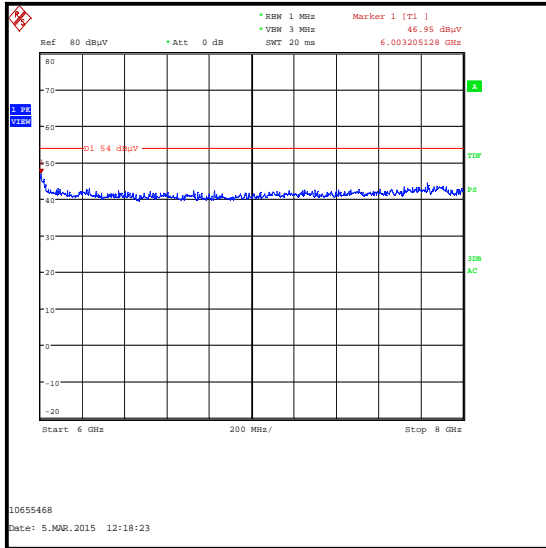
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna



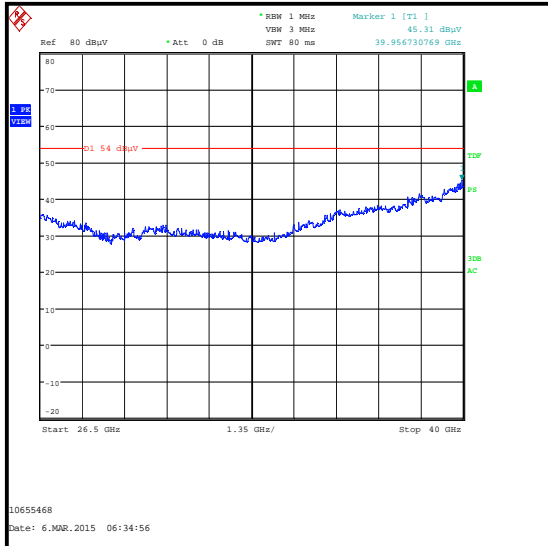
Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna



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

Transmitter Radiated Emissions (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Mar 2015	12
M1624	Thermohyrometer	JM Handelspunkt	30.5015.10	Not stated	07 Jan 2016	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	08 Dec 2015	12
G0543	Pre Amplifier	Sonoma	310N	230801	05 Jun 2015	3
A2131	Low Pass Filter	Atlan TecRF	AFL-02000	JFB1004-002	25 Apr 2015	12
A1834	Attenuator	Hewlett Packard	8491B	10444	Calibrated before use	12
A490	Antenna	Chase	CBL6111A	1590	29 Apr 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	31 Mar 2015	12
M1656	Thermohyrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	20 Feb 2016	12
A2000	Attenuator	Huber & Suhner	6830.17.B	301623	12 Apr 2015	12
A2140	Attenuator	Atlan TecRF	AN18-10	090918-04	25 Apr 2015	12
A2176	High Pass Filter	AtlanTec RF	AFH-07000	800980	12 Apr 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
M1390	26.5 GHz to 40 GHz Harmonic Mixer	Farran Technology	WHMP 28	FTL1677B	Calibrated before use	N/A
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	Calibrated before use	N/A
A366	Isolator	MRI	FRR-400	169	Calibrated before use	N/A

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".

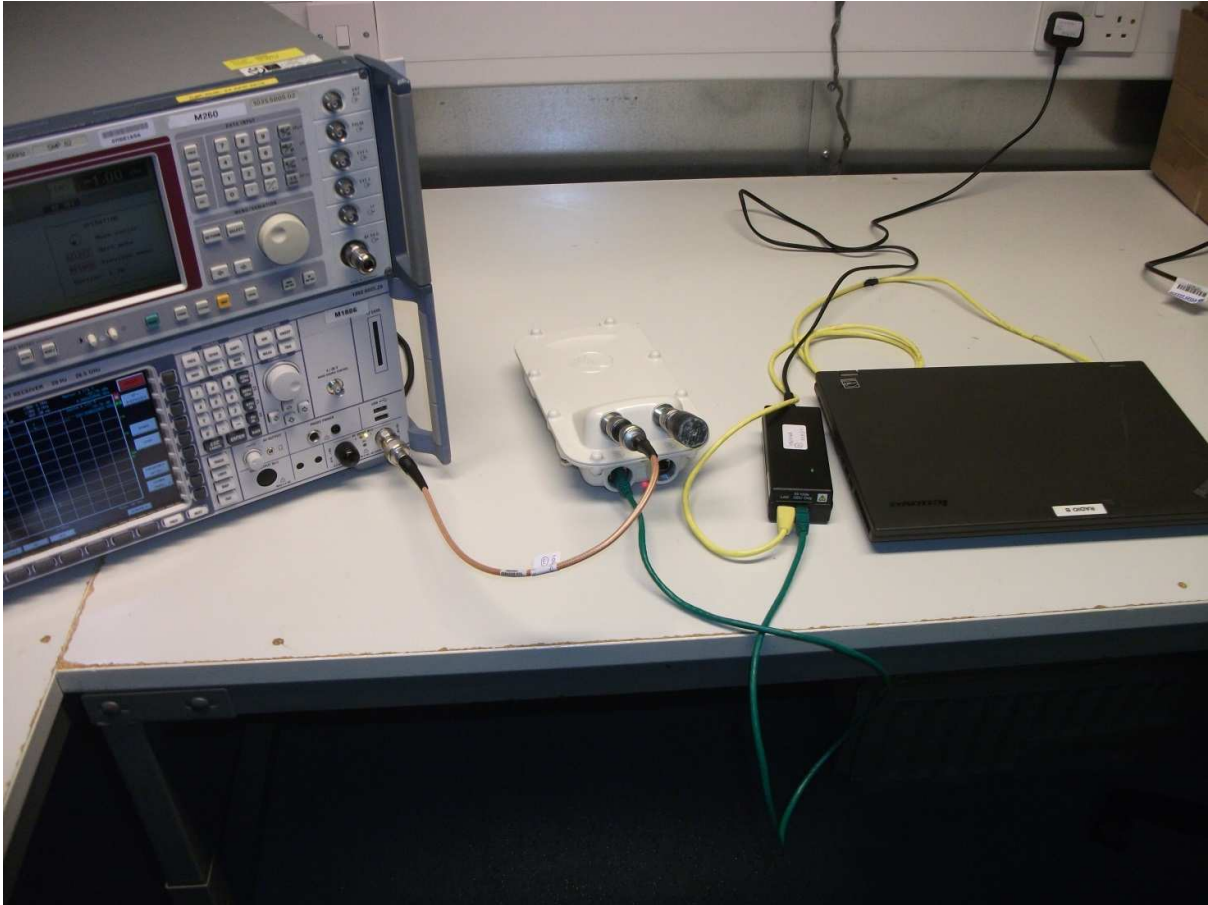
Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Conducted Maximum Peak Output Power	5725 MHz to 5850 MHz	95%	±0.76 dB
Power Spectral Density	5725 MHz to 5850 MHz	95%	±1.13 dB
6 dB Bandwidth	5725 MHz to 5850 MHz	95%	±3.92 %
Conducted Spurious Emissions	9 kHz to 40 GHz	95%	±2.62 dB
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	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.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	6 10 36 78	-	Inserted additional test methods and procedures Inserted Note 4 Changed Note 2 wording Changed order of Notes

Appendix 1. Conducted Test Setup Photograph



EUT configuration for conducted measurements

--- END OF REPORT---