



TEST REPORT

Test Report No. : UL-RPT-RP10700048JD01A V2.0

Manufacturer : Cambium Networks Ltd

Model No. : PTP 700

FCC ID : QWP-45700

Test Standard(s) : FCC Parts 15.207, 15.209 & 15.247

1. This report may not be reproduced other than in full, except with the prior written approval of UL VS LTD.
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: 22 May 2015

Checked by:

Sarah Williams
Engineer, Radio Laboratory

Issued by :

pp

John Newell
Quality Manager,
UL VS LTD



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

UL VS LTD

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG, UK
Telephone: +44 (0)1256 312000
Facsimile: +44 (0)1256 312001

This page has been left intentionally blank.

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	9
4. Operation and Monitoring of the EUT during Testing	10
4.1. Operating Modes	10
4.2. Configuration and Peripherals	10
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	18
5.2.3. Power Spectral Density	28
5.2.4. Maximum Conducted Output Power	36
5.2.5. Band Edge Conducted Emissions	44
5.2.6. Transmitter Radiated Emissions	130
6. Measurement Uncertainty	157
7. Report Revision History	158
Appendix 1. Conducted Test Setup Photograph	159

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:	31 March 2015 to 17 April 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), 15.247(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:	PTP 700
Hardware Version:	P4
Software Version:	B062-MACDSP-G7FED
Serial Number:	F52320580038
FCC ID:	QWP-45700

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. Connectorized + Integrated with two external antenna ports and Integrated Antenna.

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:		ACQ, BPSK, QPSK, 16QAM, 64QAM, 256QAM				
Intended Operating Environment:		Residential, Commercial and Light Industry				
Data rates:		BPSK: 21.8 Mbit/s; QPSK: 60.5 Mbit/s; 16QAM: 242.2 Mbit/s; 64QAM: 381 Mbit/s & 256QAM: 452.2 Mbit/s				
Power Supply Requirement(s):		Nominal		PoE supply input 120 VAC 60 Hz PoE output 48 VDC		
Maximum Conducted Output Power:		28.6 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	5729	5732	5788	5844	5846
	10	5732.25	5737	5788	5838.25	5842.5
	15	5735	5743	5788	5831.75	5838
	20	5736.75	5747.5	5788	5825.75	5835.75
	30	5740	5758.75	5788	5817.5	5835
	40	5746.25	5770.75	5788	5805	5828.75
	45	5748.25	5776.5	5788	5800.75	5826.75

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:	Lenovo
Model Name or Number:	L440
Serial Number:	R9-019EA2 14/04

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-WS54-5OR	-	1, 3
Dual polarised plate (Integrated)	21.0	MTI	MT-465027CVH	-	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
90° Sectorised (External)	17.0	Laird	ANT, AP Sector	X	2
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 and Acquisition (AQU) mode.

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 V2.1' was used to configure the EUT via the PoE power supply and Ethernet cables. The test application was used to configure power, channel bandwidth, modulation/mode and transmit frequency.
- 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 tables below show 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.

	AQU			BPSK			QPSK		
Ch. BW	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	26	29	26	26	29	26	26	28	26
10	26	29	26	26	29	26	26	28	26
15	26	29	26	26	29	26	26	28	26
20	26	29	26	26	29	26	26	28	26
30	25	29	25	25	29	25	25	28	25
40	25	29	25	25	29	25	25	28	25
45	25	29	25	25	29	25	25	28	25

	16QAM			64QAM			256QAM		
Ch. BW	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	26	27	26	26	26	26	25	25	25
10	26	27	26	26	26	26	25	25	25
15	26	27	26	26	26	26	25	25	25
20	26	27	26	26	26	26	25	25	25
30	25	27	25	25	26	25	25	25	25
40	25	27	25	25	26	25	25	25	25
45	25	27	25	25	26	25	25	25	25

Power settings used during testing (continued)

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

	BPSK			QPSK			16QAM		
Ch. BW	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
10	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
15	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
20	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
30	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
40	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
45	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75

	64QAM			256QAM		
Ch. BW	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	18.75	18.75	18.75	18.75	18.75	18.75
10	18.75	18.75	18.75	18.75	18.75	18.75
15	18.75	18.75	18.75	18.75	18.75	18.75
20	18.75	18.75	18.75	18.75	18.75	18.75
30	18.75	18.75	18.75	18.75	18.75	18.75
40	18.75	18.75	18.75	18.75	18.75	18.75
45	18.75	18.75	18.75	18.75	18.75	18.75

Omnidirectional Antenna

	BPSK			QPSK			16QAM		
Ch. BW	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25
10	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25
15	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25
20	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25
30	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25
40	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25
45	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25

	64QAM			256QAM		
Ch. BW	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	23.25	23.25	23.25	23.25	23.25	23.25
10	23.25	23.25	23.25	23.25	23.25	23.25
15	23.25	23.25	23.25	23.25	23.25	23.25
20	23.25	23.25	23.25	23.25	23.25	23.25
30	23.25	23.25	23.25	23.25	23.25	23.25
40	23.25	23.25	23.25	23.25	23.25	23.25
45	23.25	23.25	23.25	23.25	23.25	23.25

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:	Georgios Vrezas	Test Date:	15 April 2015
Test Sample Serial Number:	F52320580038		

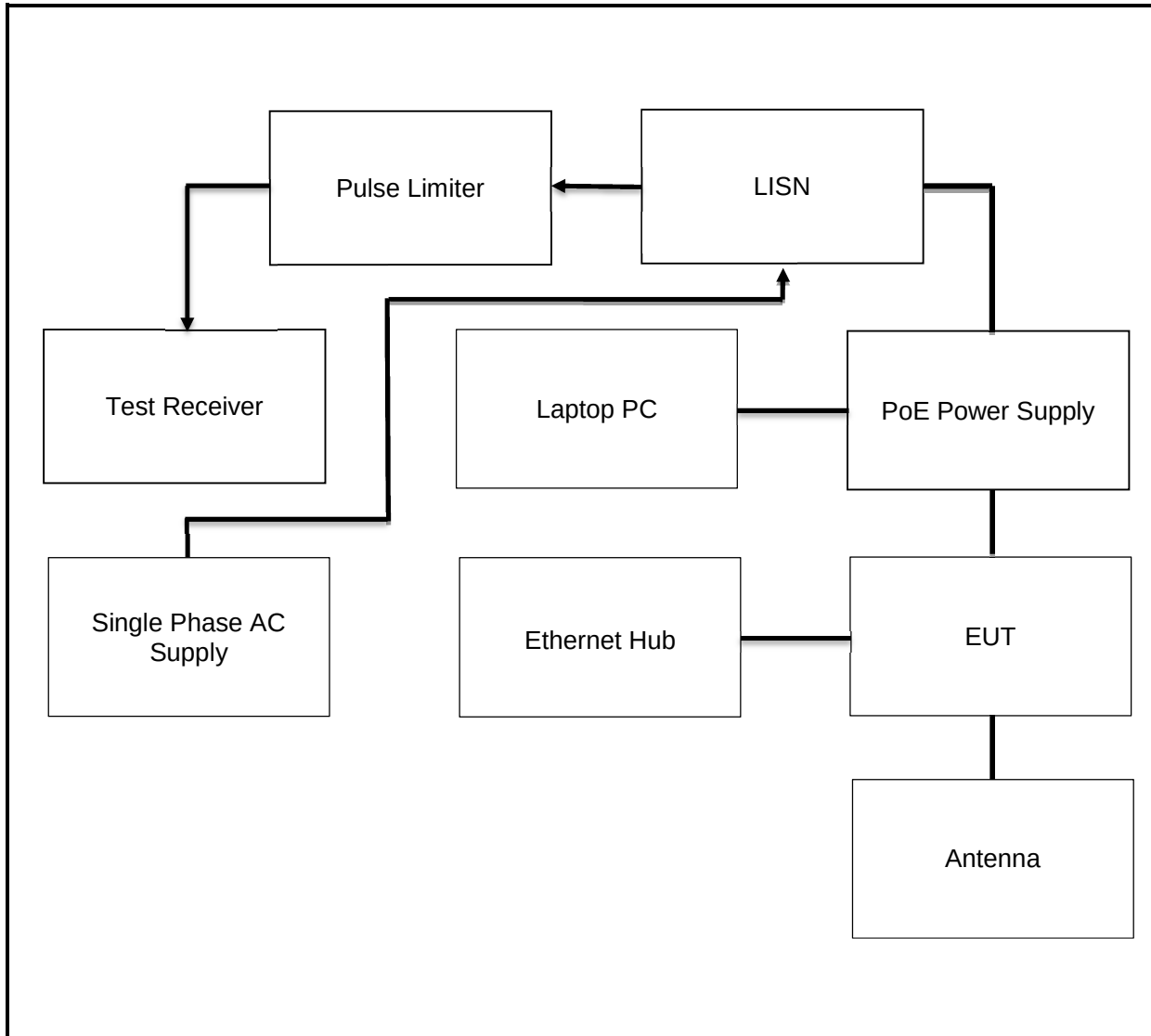
FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10-2013 Section 6.2 referencing ANSI C63.4-2014

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	47

Note(s):

1. 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.
2. 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.
3. The earth bonding point on the EUT was connected to the metal structure of the test chamber during testing.
4. 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**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.150	Live	55.2	66.0	10.8	Complied
0.425	Live	34.5	57.4	22.9	Complied
1.149	Live	37.5	56.0	18.5	Complied
2.387	Live	38.8	56.0	17.2	Complied
4.731	Live	34.0	56.0	22.0	Complied
14.213	Live	39.5	60.0	20.5	Complied

Results: Live / Average

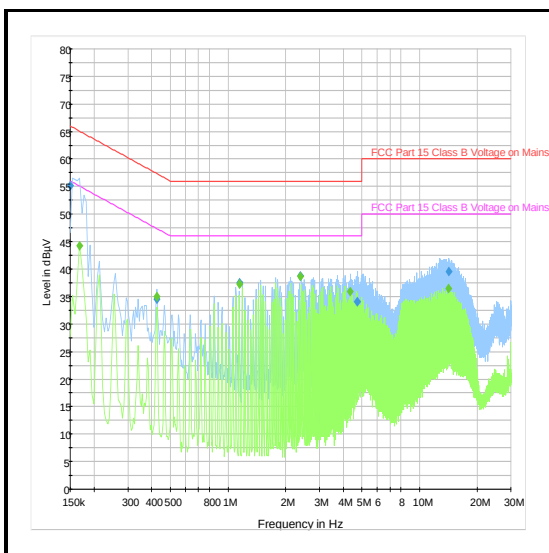
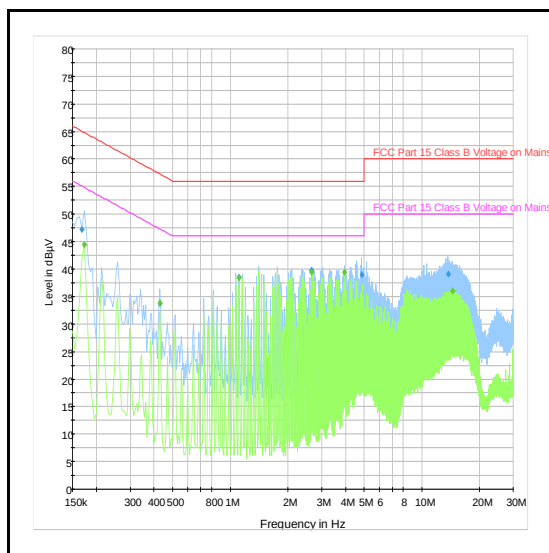
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.168	Live	44.2	55.1	10.9	Complied
0.425	Live	35.0	47.4	12.4	Complied
1.149	Live	37.3	46.0	8.7	Complied
2.387	Live	38.6	46.0	7.4	Complied
4.349	Live	35.8	46.0	10.2	Complied
14.123	Live	36.5	50.0	13.5	Complied

Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.168	Neutral	47.2	65.1	17.9	Complied
0.429	Neutral	33.7	57.3	23.6	Complied
1.113	Neutral	38.5	56.0	17.5	Complied
2.657	Neutral	39.8	56.0	16.2	Complied
4.844	Neutral	39.0	56.0	17.0	Complied
13.718	Neutral	39.1	60.0	20.9	Complied

Results: Neutral / Average

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.173	Neutral	44.5	54.8	10.3	Complied
0.429	Neutral	33.9	47.3	13.4	Complied
1.113	Neutral	38.4	46.0	7.6	Complied
2.657	Neutral	39.4	46.0	6.6	Complied
3.944	Neutral	39.5	46.0	6.5	Complied
14.492	Neutral	36.0	50.0	14.0	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 2015	12
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	N/A	07 Jan 2016	12

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

Test Engineer:	Georgios Vrezas	Test Date:	13 April 2015
Test Sample Serial Number:	F52320580038		

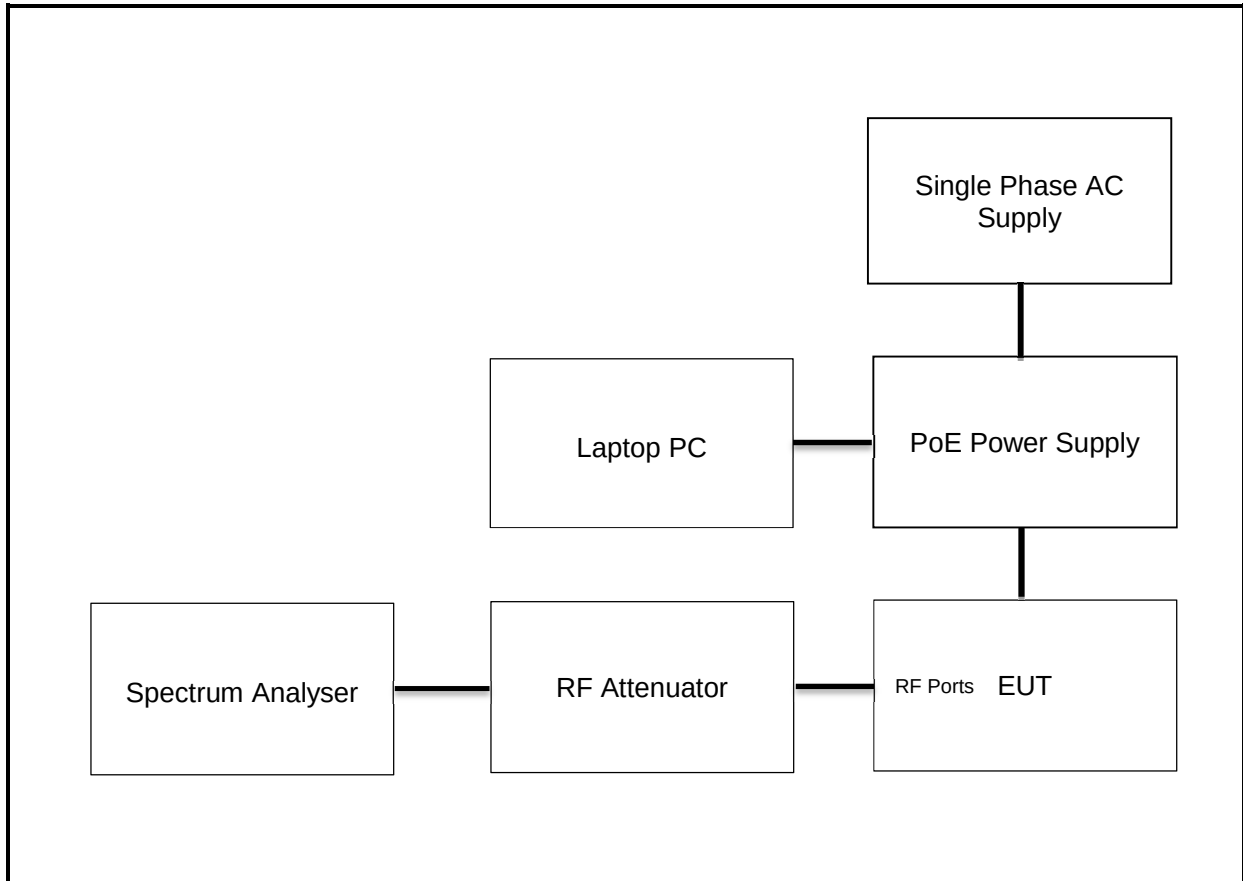
FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8 Option 1 and Notes below

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	29

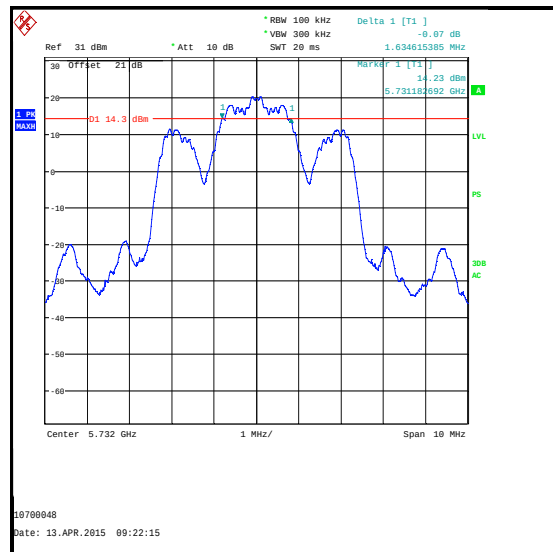
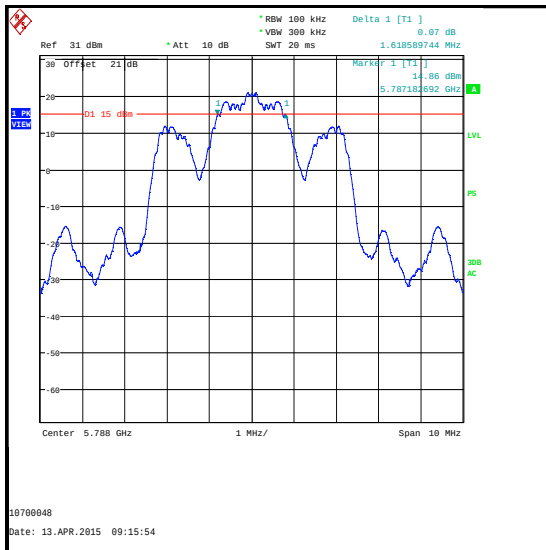
Note(s):

1. Minimum 6 dB bandwidth measurements were performed on both RF ports with the EUT transmitting at maximum power with BPSK modulation type. In addition, the EUT operates in AQU (Acquisition) mode at full power on all channel and all supported channel widths. AQU results are also reported. 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. The EUT has reduced power on the bottom and top channels in order to comply with band edge emission limits, therefore minimum 6 dB bandwidth tests were also performed on the lowest and highest channels that support maximum power.
2. Spot checks were also performed on QPSK, 16QAM, 64QAM and 256QAM with a 5 MHz channel and the results were found to be comparable to BPSK modulation. 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 21 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 31 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:**

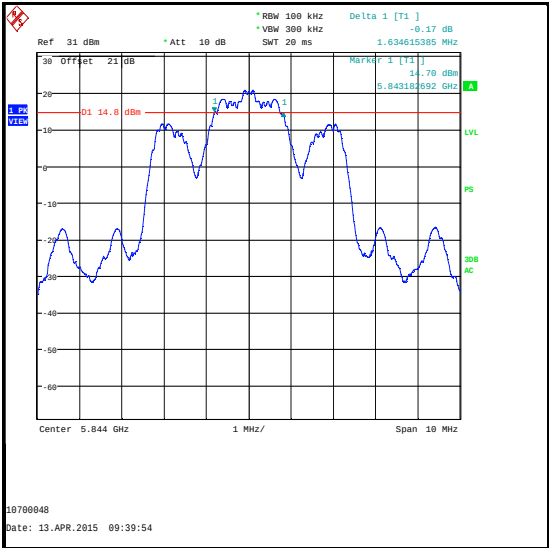
Minimum 6 dB Bandwidth (continued)**Results: 5 MHz Channel / AQU / H Port**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	1.647	≥0.5	1.147	Complied
Lowest Full Power	1.635	≥0.5	1.135	Complied
Middle	1.619	≥0.5	1.119	Complied
Highest Full Power	1.635	≥0.5	1.135	Complied
Top	1.667	≥0.5	1.167	Complied

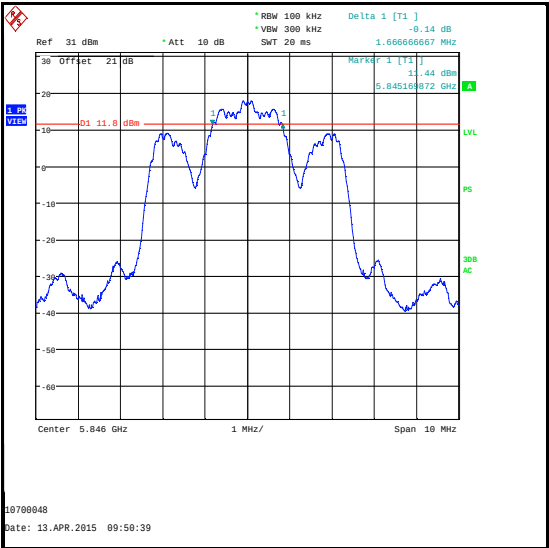
**Bottom Channel****Lowest Full Power Channel****Middle Channel**

Minimum 6 dB Bandwidth (continued)

Results: 5 MHz Channel / AQU / H Port



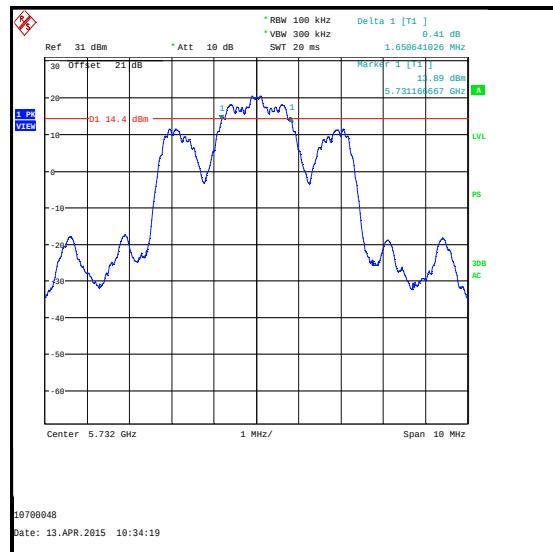
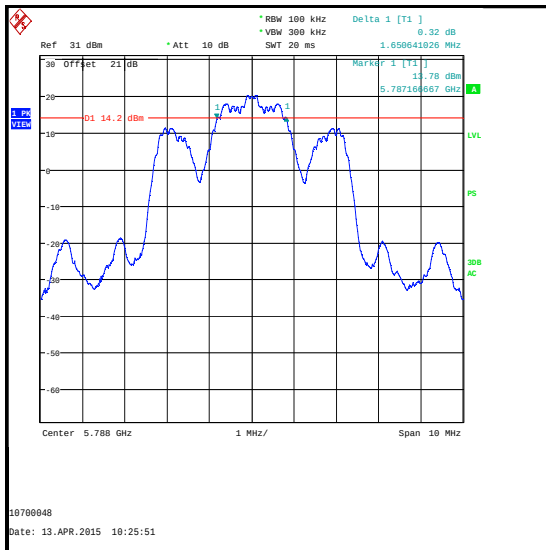
Highest Full Power Channel

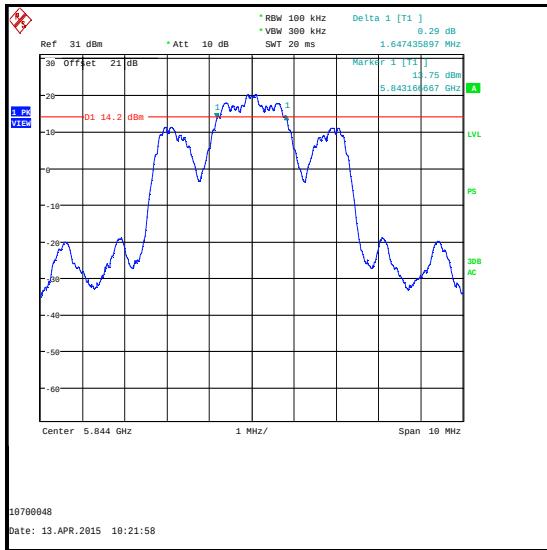
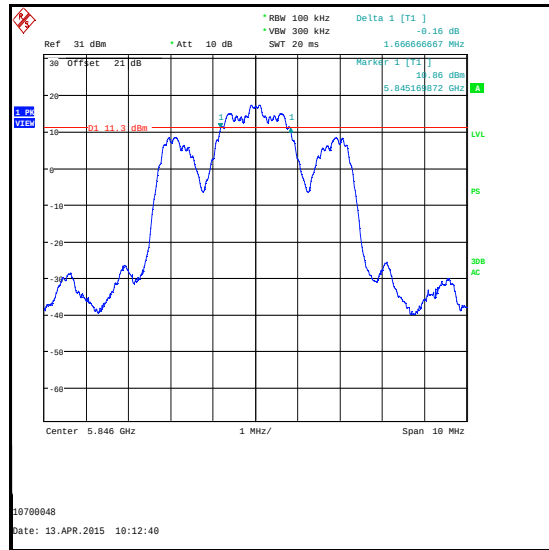


Top Channel

Minimum 6 dB Bandwidth (continued)**Results: 5 MHz Channel / AQU / V Port**

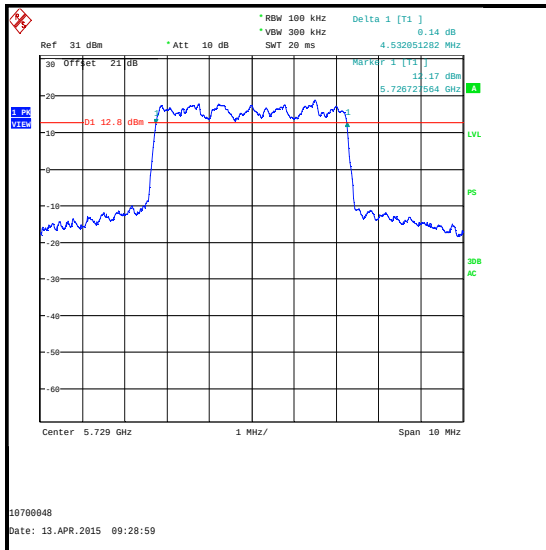
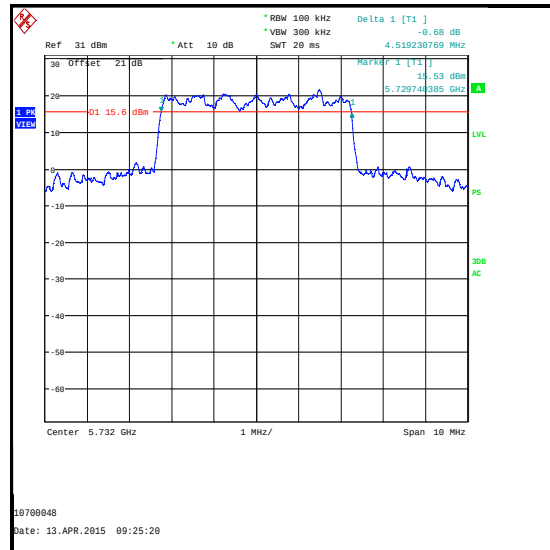
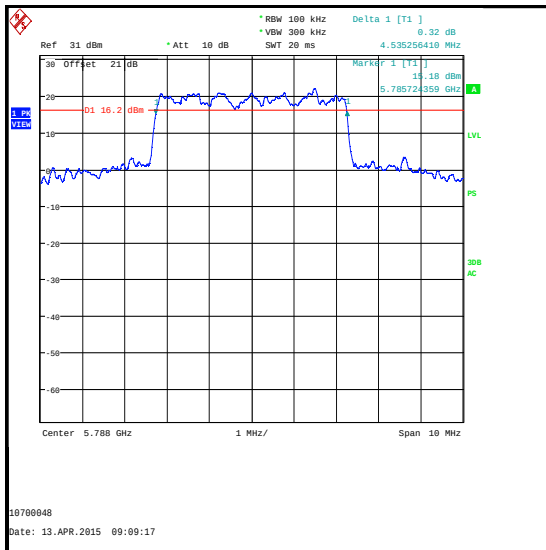
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	1.667	≥0.5	1.167	Complied
Lowest Full Power	1.651	≥0.5	1.151	Complied
Middle	1.651	≥0.5	1.151	Complied
Highest Full Power	1.647	≥0.5	1.147	Complied
Top	1.667	≥0.5	1.167	Complied

**Bottom Channel****Lowest Full Power Channel****Middle Channel**

Minimum 6 dB Bandwidth (continued)**Results: 5 MHz Channel / AQU / H Port****Highest Full Power Channel****Top Channel**

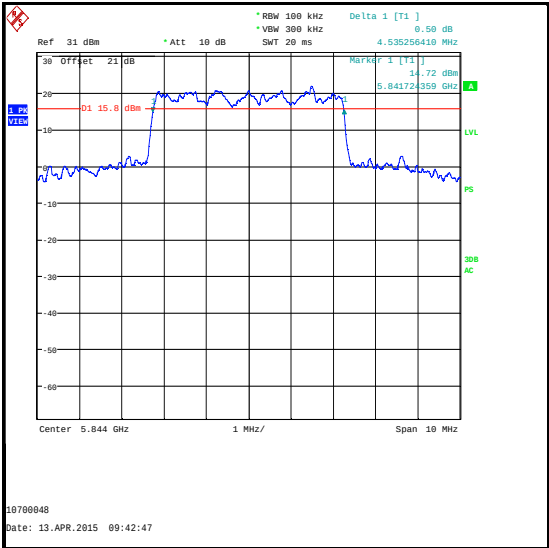
Minimum 6 dB Bandwidth (continued)**Results: 5 MHz Channel / BPSK / H Port**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.532	≥0.5	4.032	Complied
Lowest Full Power	4.519	≥0.5	4.019	Complied
Middle	4.535	≥0.5	4.035	Complied
Highest Full Power	4.535	≥0.5	4.035	Complied
Top	4.535	≥0.5	4.035	Complied

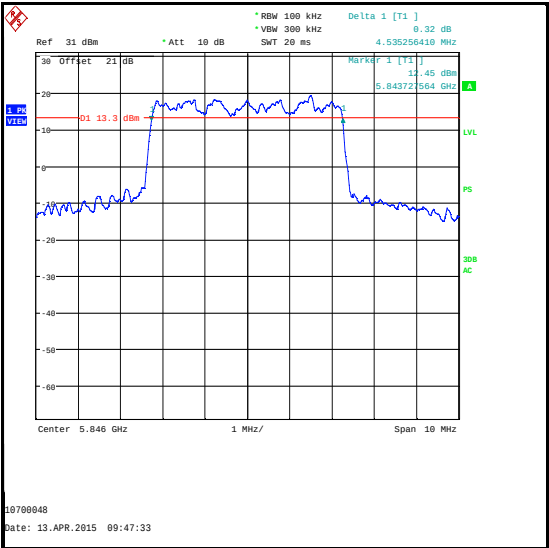
**Bottom Channel****Lowest Full Power Channel****Middle Channel**

Minimum 6 dB Bandwidth (continued)

Results: 5 MHz Channel / BPSK / H Port



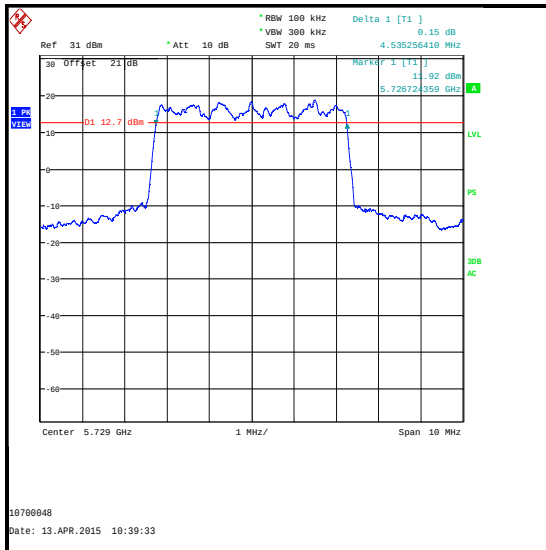
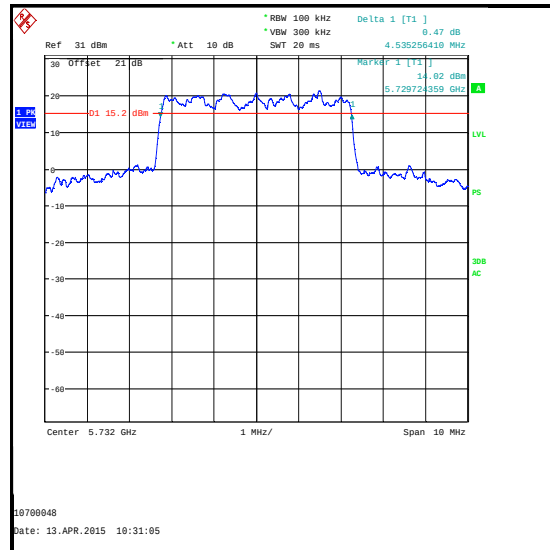
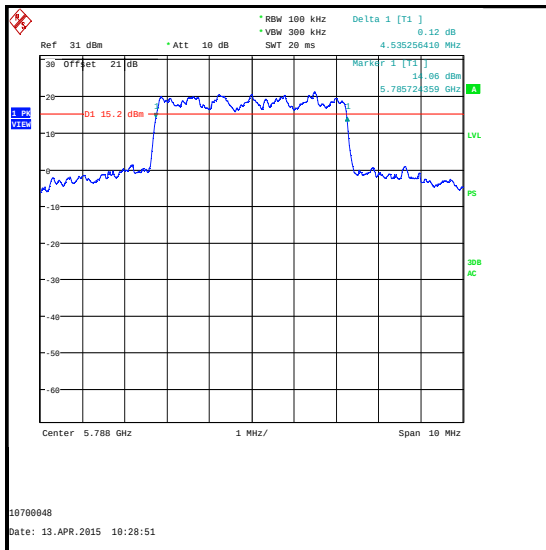
Highest Full Power Channel

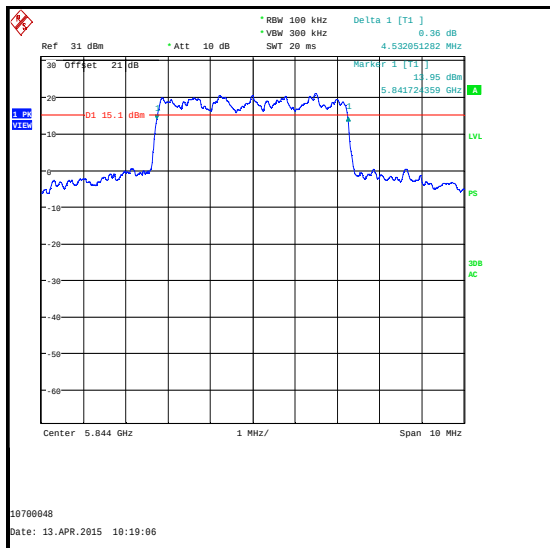
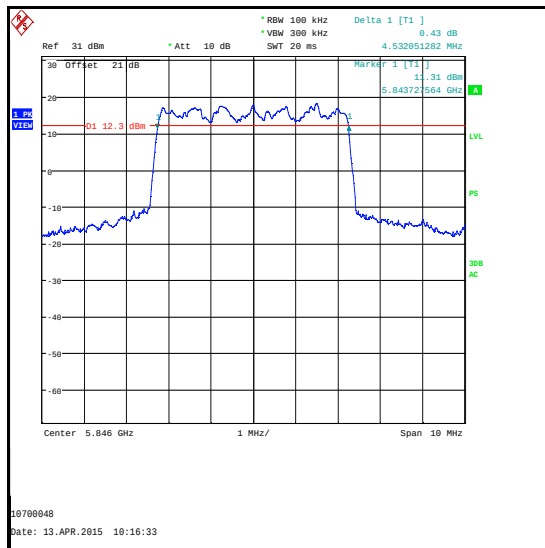


Top Channel

Minimum 6 dB Bandwidth (continued)**Results: 5 MHz Channel / BPSK / V Port**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.535	≥ 0.5	4.035	Complied
Lowest Full Power	4.535	≥ 0.5	4.035	Complied
Middle	4.535	≥ 0.5	4.035	Complied
Highest Full Power	4.532	≥ 0.5	4.032	Complied
Top	4.532	≥ 0.5	4.032	Complied

**Bottom Channel****Lowest Full Power Channel****Middle Channel**

Minimum 6 dB Bandwidth (continued)**Results: 5 MHz Channel / BPSK / V Port****Highest Full Power Channel****Top Channel****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	-
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	09 May 2015	12
M1784	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	24 Apr 2015	12

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

Test Engineer:	Georgios Vrezas	Test Dates:	09 April 2015, 10 April 2015 & 14 April 2015
Test Sample Serial Number:	F52320580038		

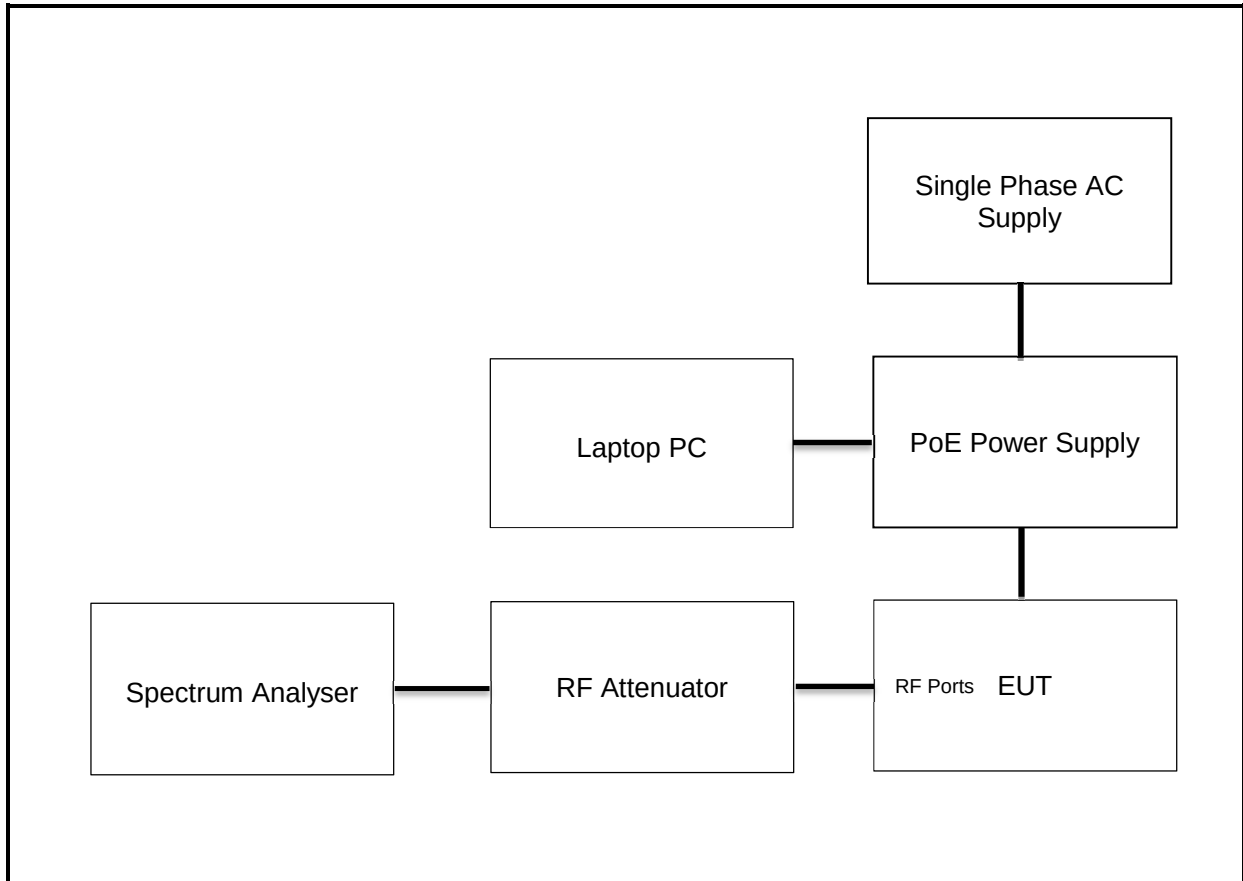
FCC Reference:	Part 15.247(e)
Test Method Used:	KDB 558074 v03r02 Section 10.3 Method AVGPS-1, KDB 662911 D02 & Notes below

Environmental Conditions:

Temperature (°C):	23 to 26
Relative Humidity (%):	28 to 39

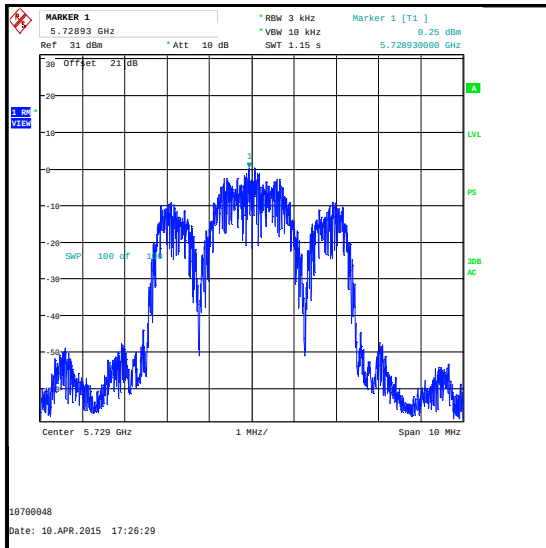
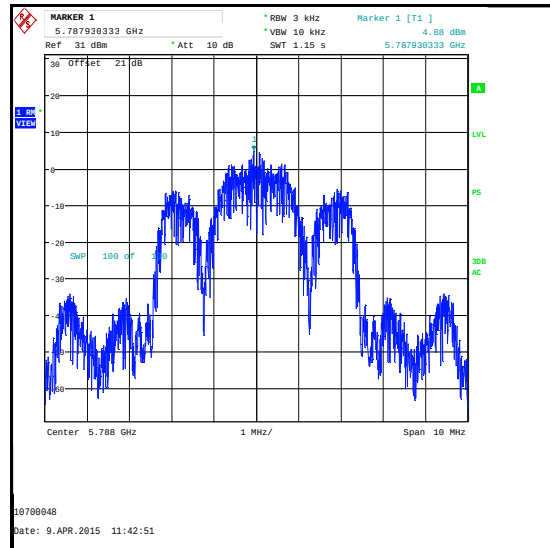
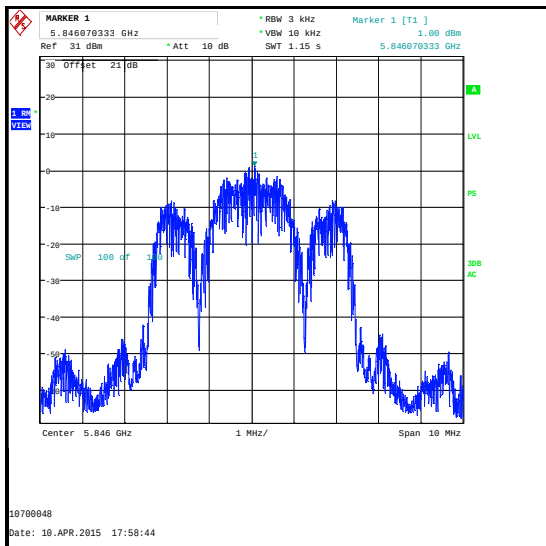
Note(s):

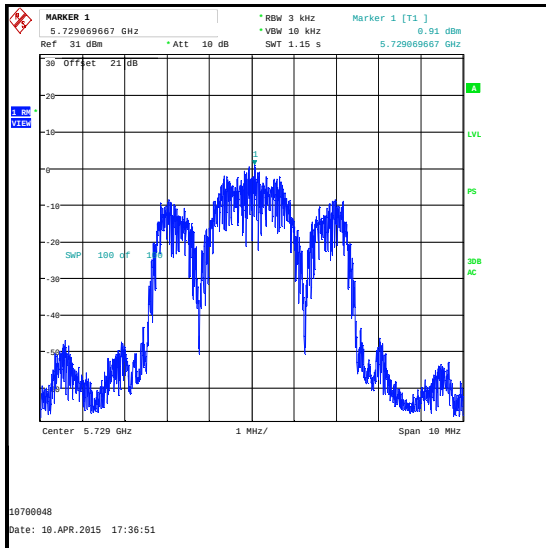
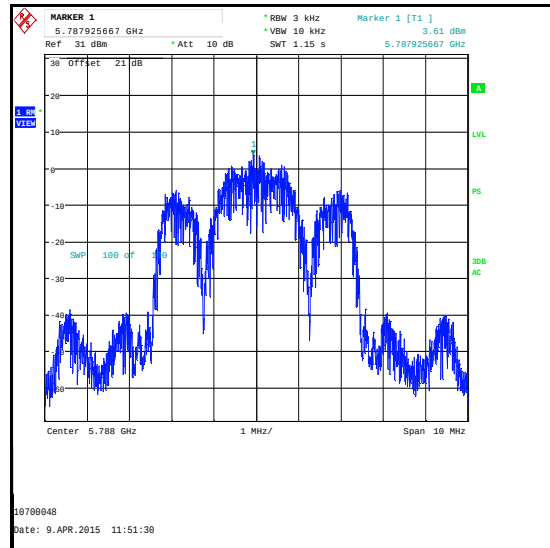
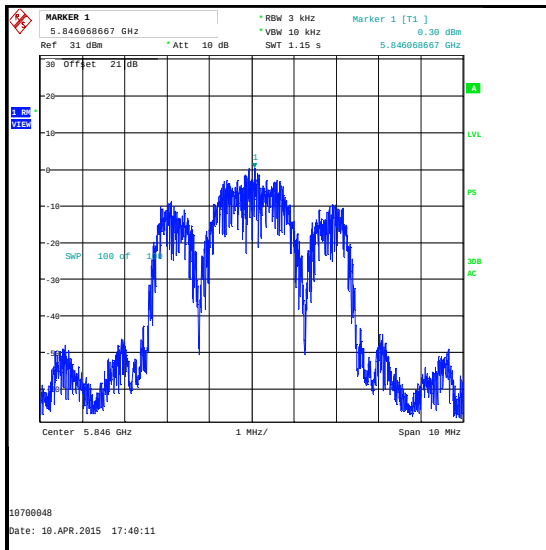
1. Transmitter Power Spectral Density tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 10.3 Method AVGPS-1.
2. Preliminary tests were performed on all modulation types and channel bandwidths to determine the configurations that showed the highest PSD levels. 5 MHz channels were found to have the highest PSD levels. Final measurements were performed on 5 MHz channels, using the worst case modulation type for each modulation family and also Acquisition mode (AQU).
3. The EUT was transmitting at 100% duty cycle at the highest power setting for each mode.
4. Power has been reduced on the bottom and top channels in order to comply with band edge requirements. Result plots and numerical results are shown for bottom middle and top channels. Additional tests were performed on the lowest channel that operates on full power and the highest channel that operates at full power. Numerical results are shown for these channels. Plots are archived on the test laboratory IT server and available for inspection if required.
5. Measurements were performed on the H and V 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 21 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 31 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used.
6. Trace averaging was performed over at least 100 sweeps. 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 / AQU**

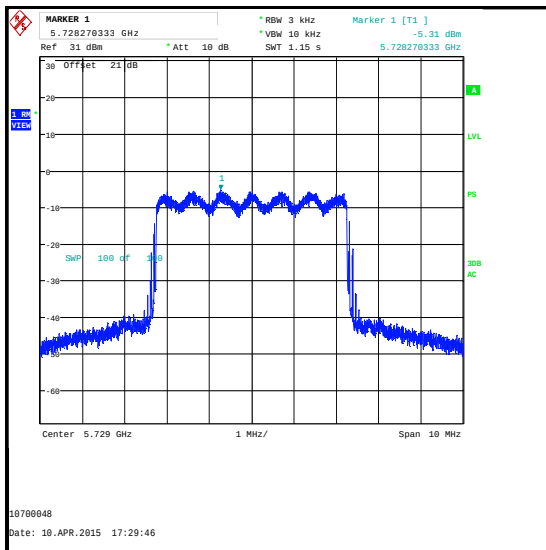
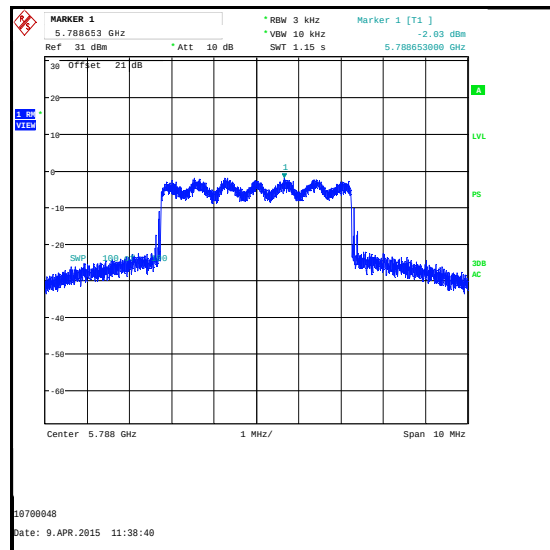
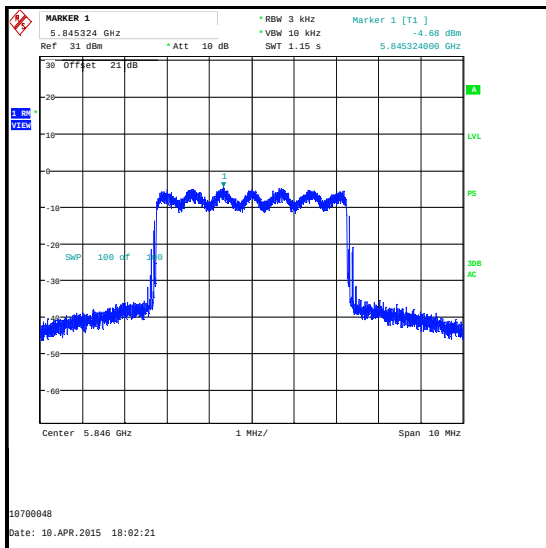
Channel	PSD at H Port (dBm / 3 kHz)	PSD at V Port (dBm / 3 kHz)	Combined PSD (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	0.3	0.9	3.6	8.0	4.4	Complied
Lowest Full Power	3.7	4.1	6.9	8.0	1.1	Complied
Middle	4.9	3.6	7.3	8.0	0.7	Complied
Highest Full Power	4.7	3.8	7.3	8.0	0.7	Complied
Top	1.0	0.3	3.7	8.0	4.3	Complied

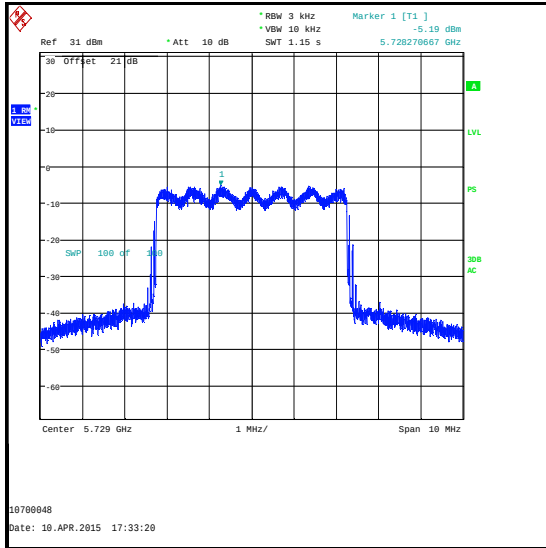
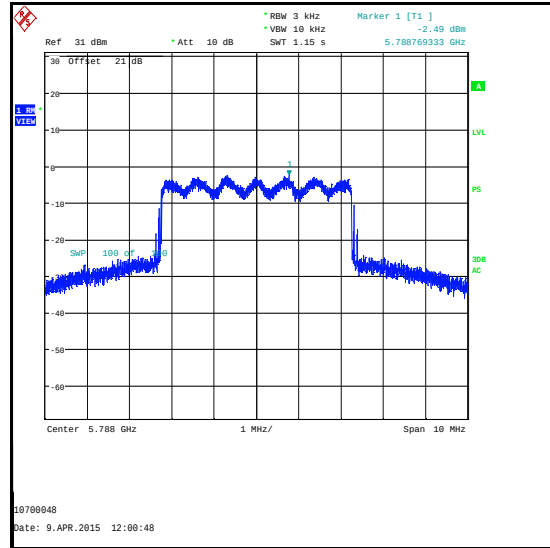
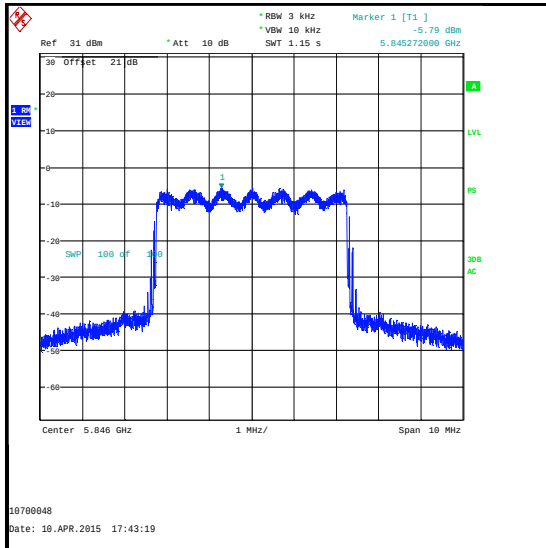
Results: 5 MHz Channel / AQU / H Port**Bottom Channel****Middle Channel****Top Channel**

Power Spectral Density (continued)**Results: 5 MHz Channel / AQU / V Port****Bottom Channel****Middle Channel****Top Channel**

Power Spectral Density (continued)**Results: 5 MHz Channel / BPSK**

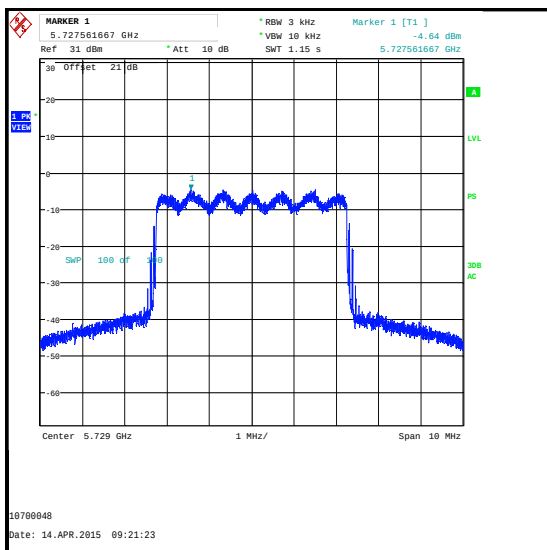
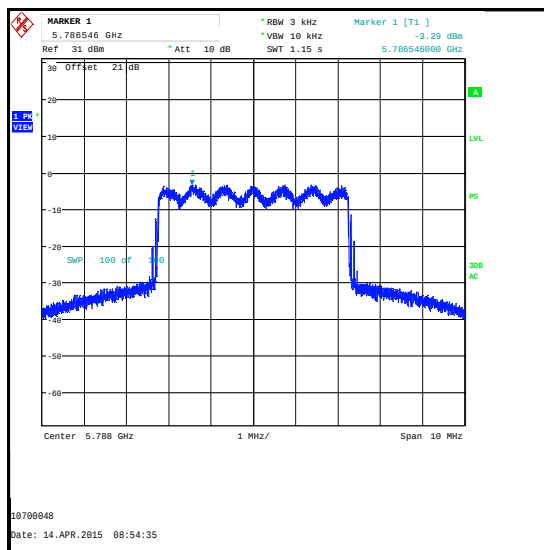
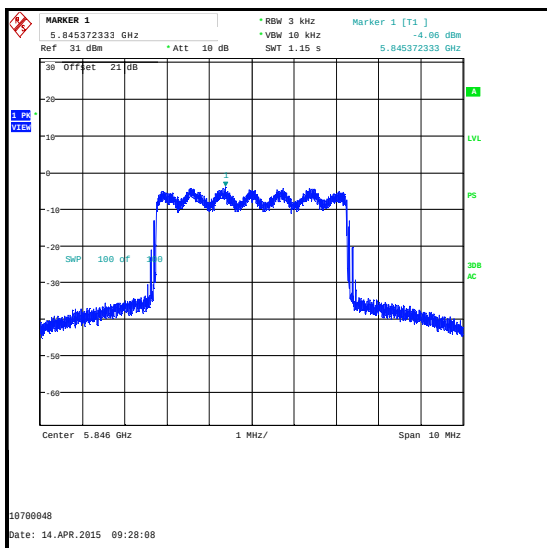
Channel	PSD at H Port (dBm / 3 kHz)	PSD at V Port (dBm / 3 kHz)	Combined PSD (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	-5.3	-5.2	-2.2	8.0	10.2	Complied
Lowest Full Power	-2.3	-2.5	0.6	8.0	7.4	Complied
Middle	-2.0	-2.5	0.8	8.0	7.2	Complied
Highest Full Power	-2.9	-2.8	0.2	8.0	7.8	Complied
Top	-4.7	-5.8	-2.2	8.0	10.2	Complied

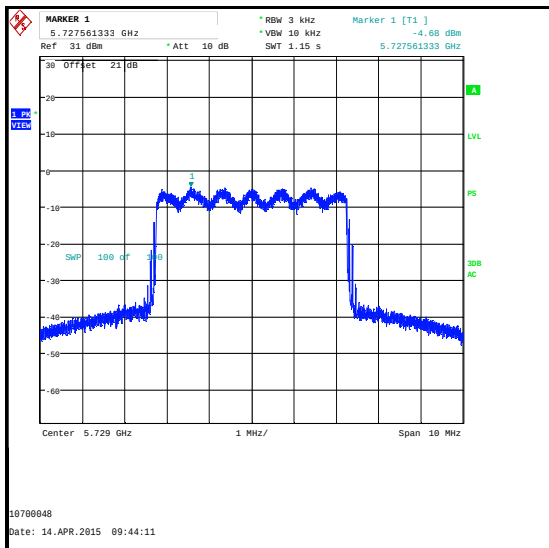
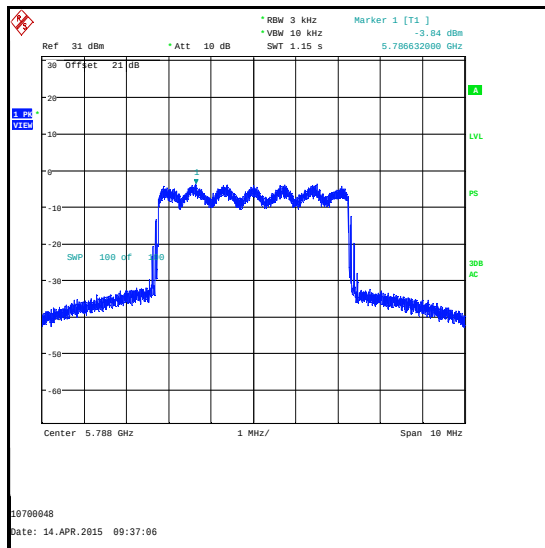
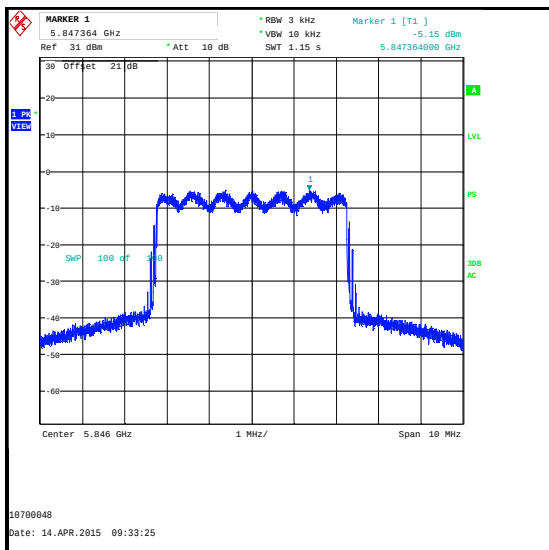
Results: 5 MHz Channel / BPSK / H Port**Bottom Channel****Middle Channel****Top Channel**

Power Spectral Density (continued)**Results: 5 MHz Channel / BPSK / V Port****Bottom Channel****Middle Channel****Top Channel**

Power Spectral Density (continued)**Results: 5 MHz Channel / 16QAM**

Channel	PSD at H Port (dBm / 3 kHz)	PSD at V Port (dBm / 3 kHz)	Combined PSD (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	-4.6	-4.7	-1.6	8.0	9.6	Complied
Lowest Full Power	-4.0	-3.9	-0.9	8.0	8.9	Complied
Middle	-3.3	-3.8	-0.5	8.0	8.5	Complied
Highest Full Power	-3.4	-4.3	-0.8	8.0	8.8	Complied
Top	-4.1	-5.1	-1.6	8.0	9.6	Complied

Results: 5 MHz Channel / 16QAM / H Port**Bottom Channel****Middle Channel****Top Channel**

Power Spectral Density (continued)**Results: 5 MHz Channel / 16QAM / V Port****Bottom Channel****Middle Channel****Top Channel****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
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	09 May 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	24 Apr 2015	12
M1784	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	24 Apr 2015	12

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

Test Engineer:	Georgios Vrezas	Test Dates:	15 April 2015 & 16 April 2015
Test Sample Serial Number:	F52320580038		

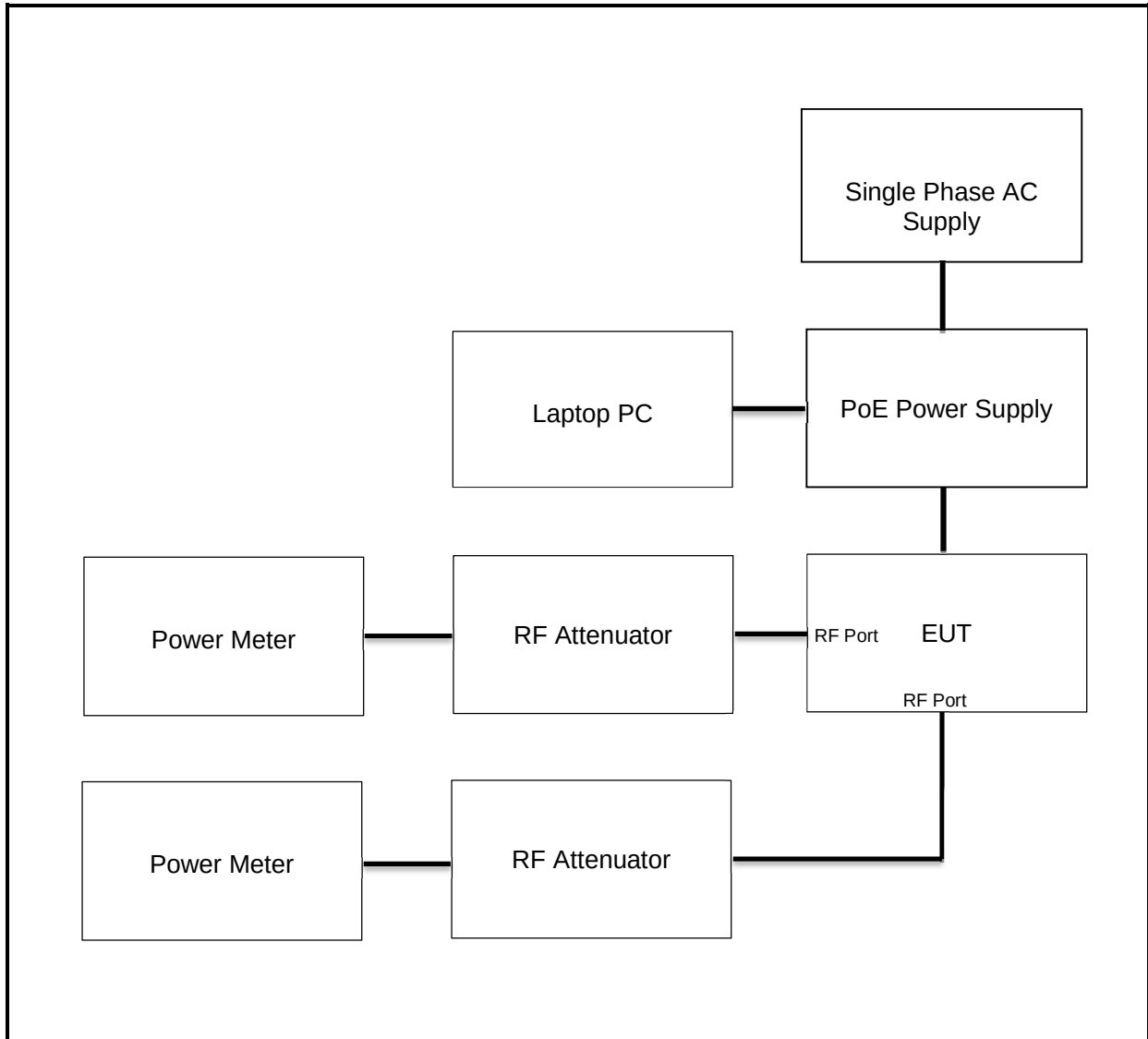
FCC Reference:	Part 15.247(b)(3), 15.247(b)(4) & Part 15.247(c)(1)(ii)
Test Method Used:	KDB 558074 Section 9.2.3.1 & KDB 662911 D02

Environmental Conditions:

Temperature (°C):	23 to 26
Relative Humidity (%):	28 to 31

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 BPSK mode on all channel widths, therefore only BPSK was tested and recorded in this test report. 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: BPSK / Directional Antennas / Point-to-Point**

Channel Bandwidth	Channel	Conducted Power H Port (dBm)	Conducted Power V Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
5	Bottom	22.6	22.6	25.6	30.0	4.4	Complied
5	Middle	26.0	25.1	28.6	30.0	1.4	Complied
5	Top	23.1	22.2	25.7	30.0	4.3	Complied
10	Bottom	22.7	22.7	25.7	30.0	4.3	Complied
10	Middle	25.9	25.2	28.6	30.0	1.4	Complied
10	Top	23.1	22.2	25.7	30.0	4.3	Complied
15	Bottom	22.8	22.6	25.7	30.0	4.3	Complied
15	Middle	25.9	25.1	28.5	30.0	1.5	Complied
15	Top	23.0	22.2	25.6	30.0	4.4	Complied
20	Bottom	22.7	22.8	25.8	30.0	4.2	Complied
20	Middle	25.8	25.0	28.4	30.0	1.6	Complied
20	Top	23.1	22.3	25.7	30.0	4.3	Complied
30	Bottom	21.7	21.7	24.7	30.0	5.3	Complied
30	Middle	25.9	25.1	28.5	30.0	1.5	Complied
30	Top	22.1	21.2	24.7	30.0	5.3	Complied
40	Bottom	21.9	21.8	24.9	30.0	5.1	Complied
40	Middle	25.8	25.0	28.4	30.0	1.6	Complied
40	Top	22.2	21.3	24.8	30.0	5.2	Complied
45	Bottom	22.0	21.8	24.9	30.0	5.1	Complied
45	Middle	25.9	25.1	28.5	30.0	1.5	Complied
45	Top	22.0	21.2	24.6	30.0	5.4	Complied

Maximum Conducted Output Power (continued)**Results: BPSK / 17 dBi Sectorised Antenna**

Channel Bandwidth	Channel	Conducted Power H Port (dBm)	Conducted Power V Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
5	Bottom	15.2	15.5	18.4	19.9	1.5	Complied
5	Middle	17.0	15.9	19.5	19.9	0.4	Complied
5	Top	16.9	14.6	18.9	19.9	1.0	Complied
10	Bottom	15.3	15.6	18.5	19.9	1.4	Complied
10	Middle	17.1	15.9	19.6	19.9	0.3	Complied
10	Top	16.8	14.5	18.8	19.9	1.1	Complied
15	Bottom	15.3	15.5	18.4	19.9	1.5	Complied
15	Middle	17.0	15.8	19.5	19.9	0.4	Complied
15	Top	16.7	14.6	18.8	19.9	1.1	Complied
20	Bottom	15.3	15.7	18.5	19.9	1.4	Complied
20	Middle	17.0	15.8	19.5	19.9	0.4	Complied
20	Top	16.8	14.6	18.8	19.9	1.1	Complied
30	Bottom	15.4	15.7	18.6	19.9	1.3	Complied
30	Middle	17.0	15.8	19.5	19.9	0.4	Complied
30	Top	16.9	14.5	18.9	19.9	1.0	Complied
40	Bottom	15.5	15.8	18.7	19.9	1.2	Complied
40	Middle	17.0	15.7	19.4	19.9	0.5	Complied
40	Top	16.8	14.8	18.9	19.9	1.0	Complied
45	Bottom	15.6	15.7	18.7	19.9	1.2	Complied
45	Middle	17.0	15.7	19.4	19.9	0.5	Complied
45	Top	16.6	14.8	18.8	19.9	1.1	Complied

Maximum Conducted Output Power (continued)**Results: BPSK / 17 dBi Sectorised Antenna**

Channel Bandwidth	Channel	Combined Conducted Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
5	Bottom	18.4	16.1	34.5	36.0	1.5	Complied
5	Middle	19.5	16.1	35.6	36.0	0.4	Complied
5	Top	18.9	16.1	35.0	36.0	1.0	Complied
10	Bottom	18.5	16.1	34.6	36.0	1.4	Complied
10	Middle	19.6	16.1	35.7	36.0	0.3	Complied
10	Top	18.8	16.1	34.9	36.0	1.1	Complied
15	Bottom	18.4	16.1	34.5	36.0	1.5	Complied
15	Middle	19.5	16.1	35.6	36.0	0.4	Complied
15	Top	18.8	16.1	34.9	36.0	1.1	Complied
20	Bottom	18.5	16.1	34.6	36.0	1.4	Complied
20	Middle	19.5	16.1	35.6	36.0	0.4	Complied
20	Top	18.8	16.1	34.9	36.0	1.1	Complied
30	Bottom	18.6	16.1	34.7	36.0	1.3	Complied
30	Middle	19.5	16.1	35.6	36.0	0.4	Complied
30	Top	18.9	16.1	35.0	36.0	1.0	Complied
40	Bottom	18.7	16.1	34.8	36.0	1.2	Complied
40	Middle	19.4	16.1	35.5	36.0	0.5	Complied
40	Top	18.9	16.1	35.0	36.0	1.0	Complied
45	Bottom	18.7	16.1	34.8	36.0	1.2	Complied
45	Middle	19.4	16.1	35.5	36.0	0.5	Complied
45	Top	18.8	16.1	34.9	36.0	1.1	Complied

Maximum Conducted Output Power (continued)**Results: BPSK / 13 dBi Omnidirectional Antenna**

Channel Bandwidth	Channel	Conducted Power H Port (dBm)	Conducted Power V Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
5	Bottom	19.8	20.1	23.0	23.9	0.9	Complied
5	Middle	21.0	20.0	23.5	23.9	0.4	Complied
5	Top	20.5	19.4	23.0	23.9	0.9	Complied
10	Bottom	19.8	20.1	23.0	23.9	0.9	Complied
10	Middle	21.0	20.0	23.5	23.9	0.4	Complied
10	Top	20.5	19.4	23.0	23.9	0.9	Complied
15	Bottom	19.9	20.2	23.1	23.9	0.8	Complied
15	Middle	20.9	20.0	23.5	23.9	0.4	Complied
15	Top	20.4	19.5	23.0	23.9	0.9	Complied
20	Bottom	19.9	20.2	23.1	23.9	0.8	Complied
20	Middle	21.0	20.1	23.6	23.9	0.3	Complied
20	Top	20.4	19.4	22.9	23.9	1.0	Complied
30	Bottom	20.0	20.1	23.1	23.9	0.8	Complied
30	Middle	20.9	20.0	23.5	23.9	0.4	Complied
30	Top	20.4	19.4	22.9	23.9	1.0	Complied
40	Bottom	20.1	20.2	23.2	23.9	0.7	Complied
40	Middle	21.0	20.0	23.5	23.9	0.4	Complied
40	Top	20.4	19.5	23.0	23.9	0.9	Complied
45	Bottom	20.2	20.2	23.2	23.9	0.7	Complied
45	Middle	20.9	20.0	23.5	23.9	0.4	Complied
45	Top	20.5	19.6	23.1	23.9	0.8	Complied

Maximum Conducted Output Power (continued)**Results: BPSK / 13 dBi Omnidirectional Antenna**

Channel Bandwidth	Channel	Combined Conducted Power (dBm)	Declared Antenna Gain + cable loss (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
5	Bottom	23.0	12.1	35.1	36.0	0.9	Complied
5	Middle	23.5	12.1	35.6	36.0	0.4	Complied
5	Top	23.0	12.1	35.1	36.0	0.9	Complied
10	Bottom	23.0	12.1	35.1	36.0	0.9	Complied
10	Middle	23.5	12.1	35.6	36.0	0.4	Complied
10	Top	23.0	12.1	35.1	36.0	0.9	Complied
15	Bottom	23.1	12.1	35.2	36.0	0.8	Complied
15	Middle	23.5	12.1	35.6	36.0	0.4	Complied
15	Top	23.0	12.1	35.1	36.0	0.9	Complied
20	Bottom	23.1	12.1	35.2	36.0	0.8	Complied
20	Middle	23.6	12.1	35.7	36.0	0.3	Complied
20	Top	22.9	12.1	35.0	36.0	1.0	Complied
30	Bottom	23.1	12.1	35.2	36.0	0.8	Complied
30	Middle	23.5	12.1	35.6	36.0	0.4	Complied
30	Top	22.9	12.1	35.0	36.0	1.0	Complied
40	Bottom	23.2	12.1	35.3	36.0	0.7	Complied
40	Middle	23.5	12.1	35.6	36.0	0.4	Complied
40	Top	23.0	12.1	35.1	36.0	0.9	Complied
45	Bottom	23.2	12.1	35.3	36.0	0.7	Complied
45	Middle	23.5	12.1	35.6	36.0	0.4	Complied
45	Top	23.1	12.1	35.2	36.0	0.8	Complied

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

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1784	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	24 Apr 2015	12
M1435	Power Meter	Hewlett Packard	437B	3125U14631	30 Apr 2015	12
M1009	Power Meter	Hewlett Packard	437B	3125U13706	27 Jan 2016	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
A2527	Attenuator	AtlanTecRF	AN18W5-20	832828#2	Calibrated before use	-
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	Calibrated before use	-

5.2.5. Band Edge Conducted Emissions

Test Engineers:	Ian Watch & Georgios Vrezas	Test Dates:	31 March 2015 to 10 April 2015
Test Sample Serial Number:	F52320580038		

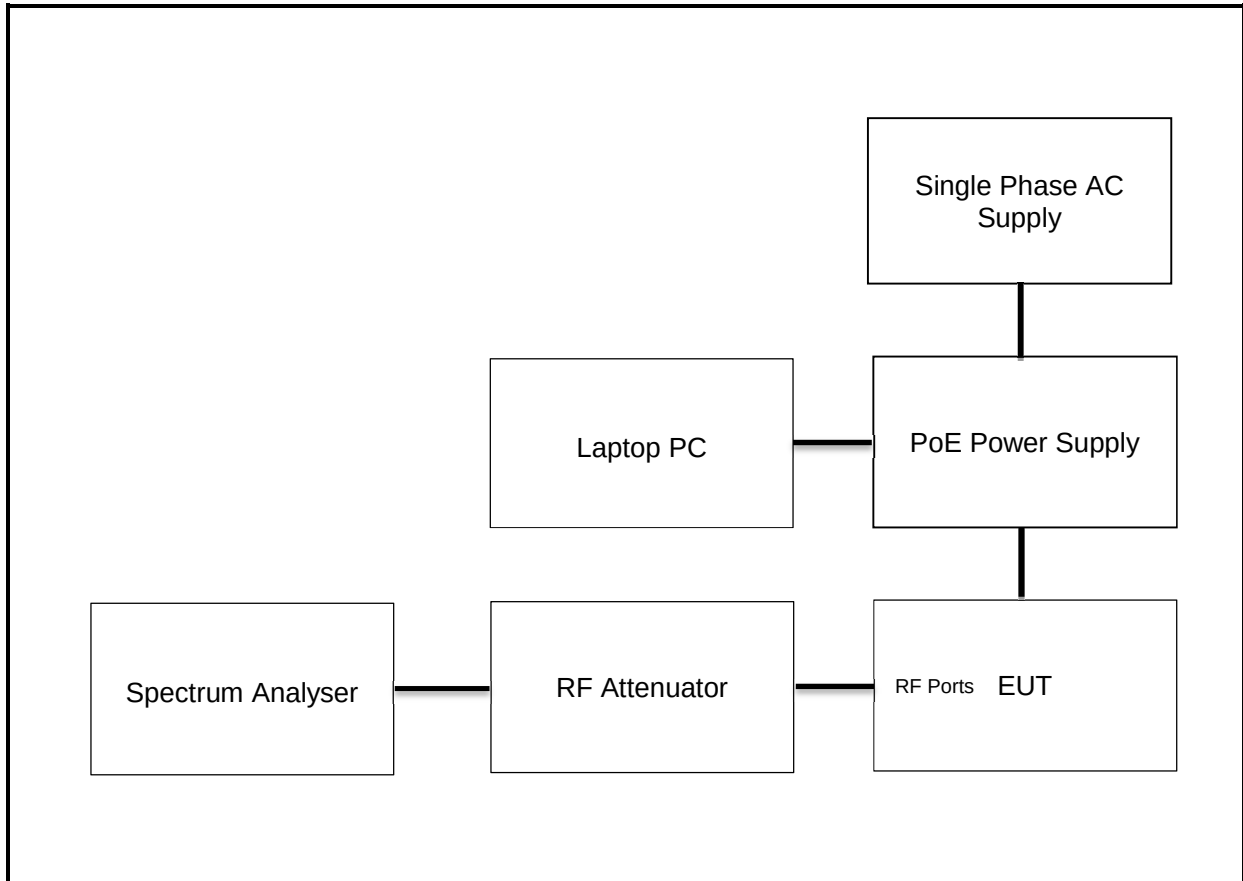
FCC Reference:	Part 15.247(d)
Test Method Used:	FCC KDB 558074 Sections 11 and 13; FCC KDB 662911 D01 E)3)b; ANSI C63.10-2009 Section 6.9.2 and Notes below

Environmental Conditions:

Temperature (°C):	22 to 25
Relative Humidity (%):	24 to 39

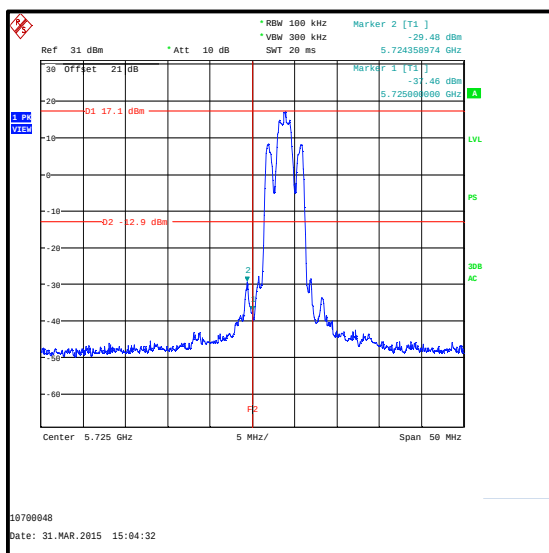
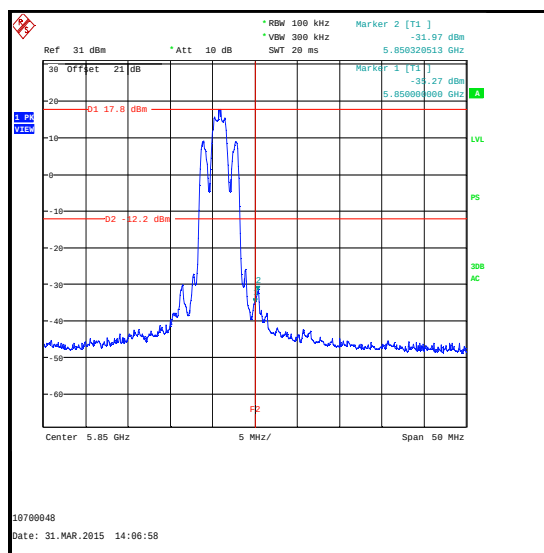
Note(s):

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 21 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 31 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:**

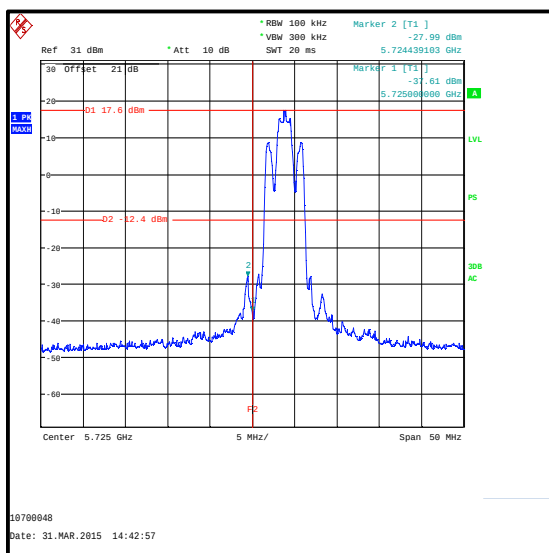
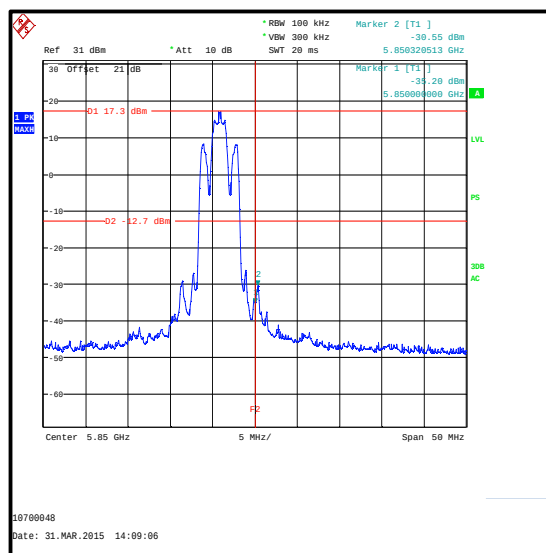
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.359	-29.5	-12.9	16.6	Complied
5725	-37.5	-12.9	24.6	Complied
5850	-35.3	-12.2	23.1	Complied
5850.321	-32.0	-12.2	19.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

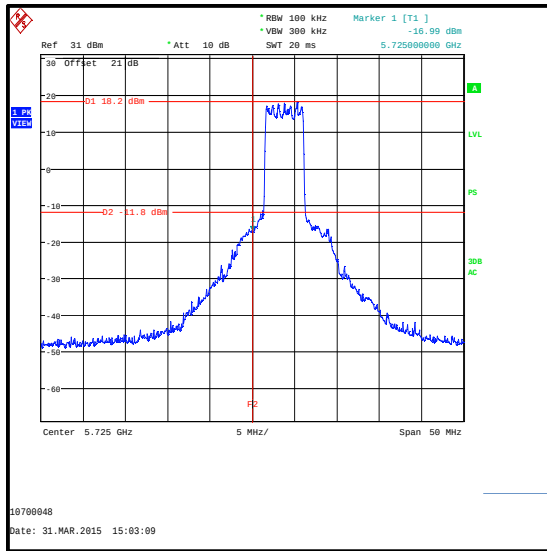
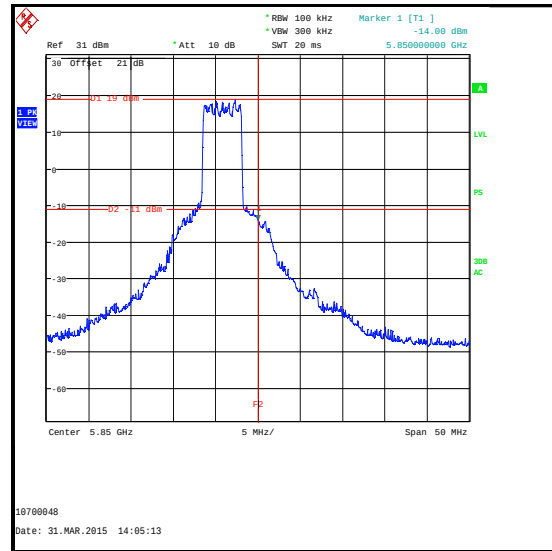
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / AQU / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.439	-28.0	-12.4	15.6	Complied
5725	-37.6	-12.4	25.2	Complied
5850	-35.2	-12.7	22.5	Complied
5850.321	-30.5	-12.7	17.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / BPSK / H Port**

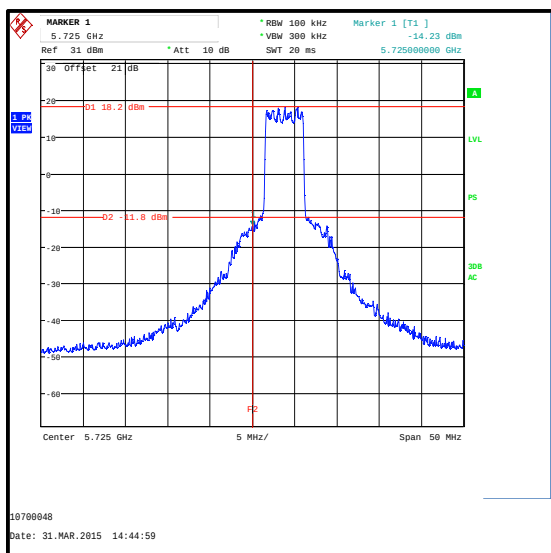
Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-17.0	-11.8	5.2	Complied
5850	-14.0	-11.0	3.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

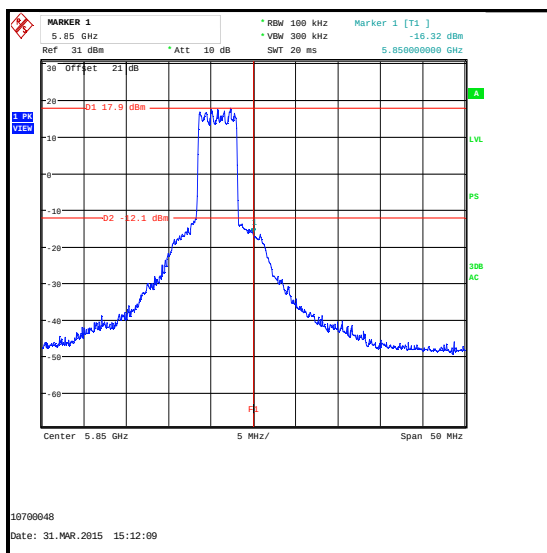
Band Edge Conducted Emissions (continued)

Results: 5 MHz Channel / BPSK / V Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-14.2	-11.8	2.4	Complied
5850	-16.3	-12.1	4.2	Complied



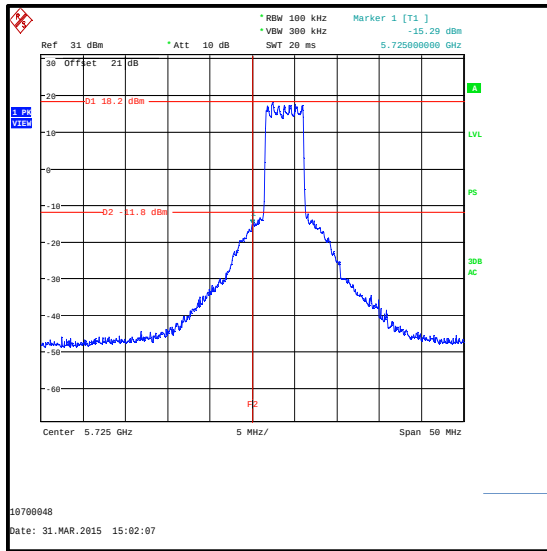
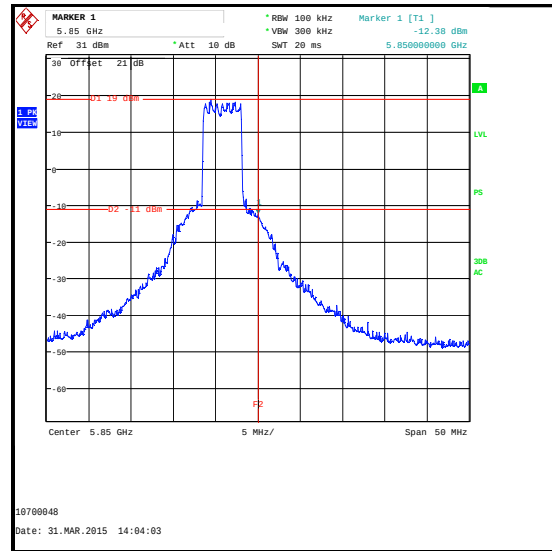
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement

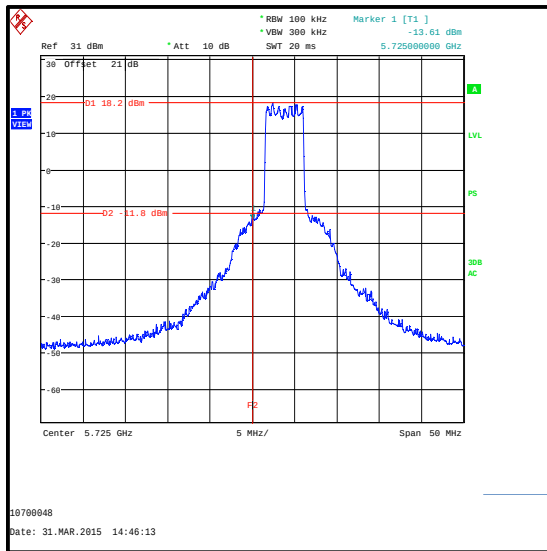
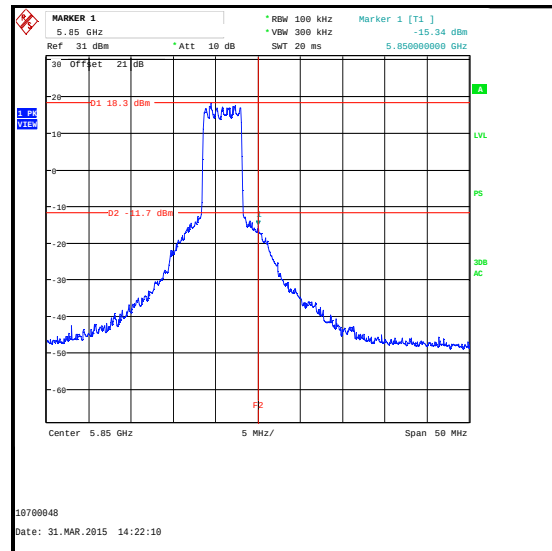
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / QPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-15.3	-11.8	3.5	Complied
5850	-12.4	-11.0	1.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

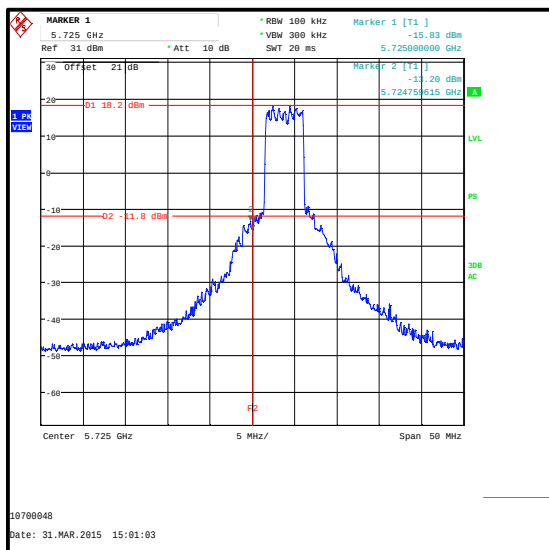
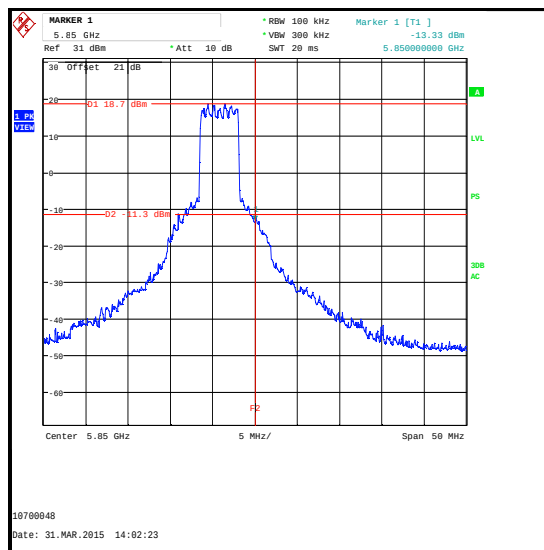
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-13.6	-11.8	1.8	Complied
5850	-15.3	-11.7	3.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

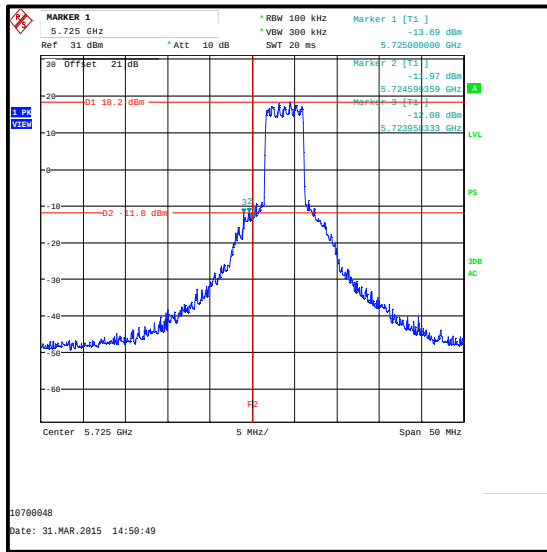
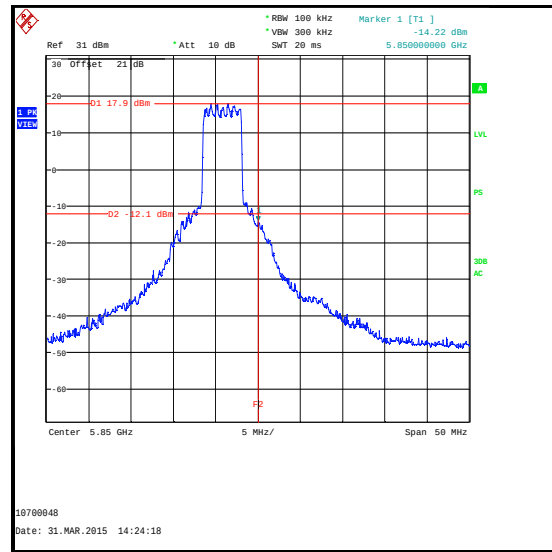
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.760	-13.2	-11.8	1.4	Complied
5725	-15.8	-11.8	4.0	Complied
5850	-13.3	-11.3	2.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

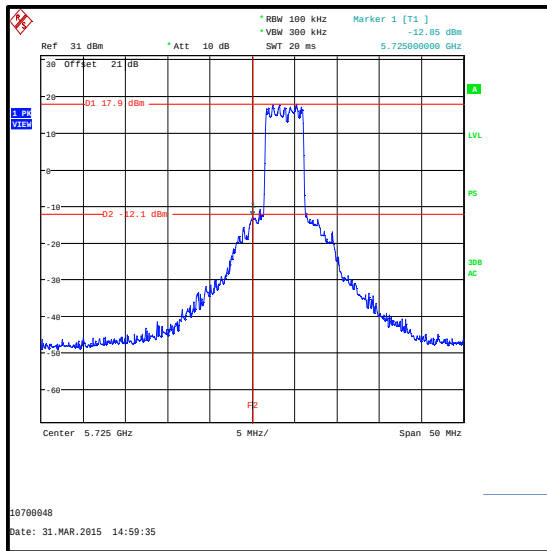
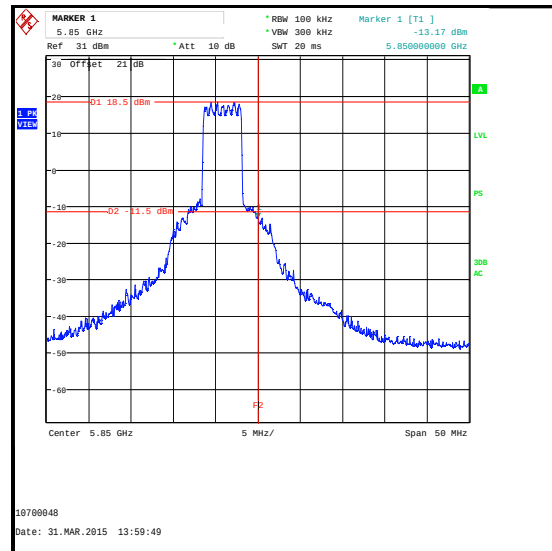
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.958	-12.1	-11.8	0.3	Complied
5724.599	-12.0	-11.8	0.2	Complied
5725	-13.7	-11.8	1.9	Complied
5850	-14.2	-12.1	2.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

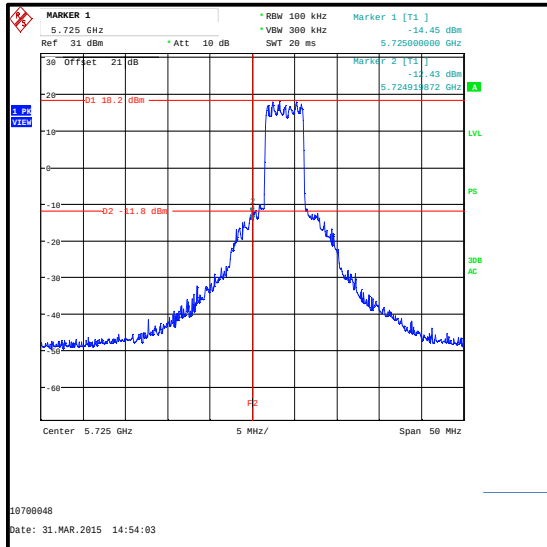
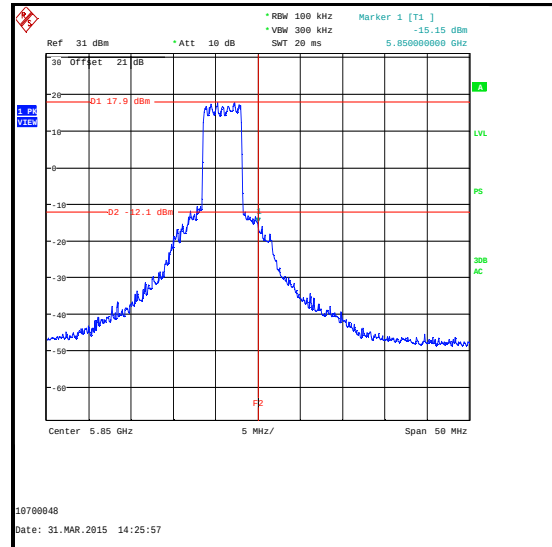
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-12.8	-12.1	0.7	Complied
5850	-13.2	-11.5	1.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

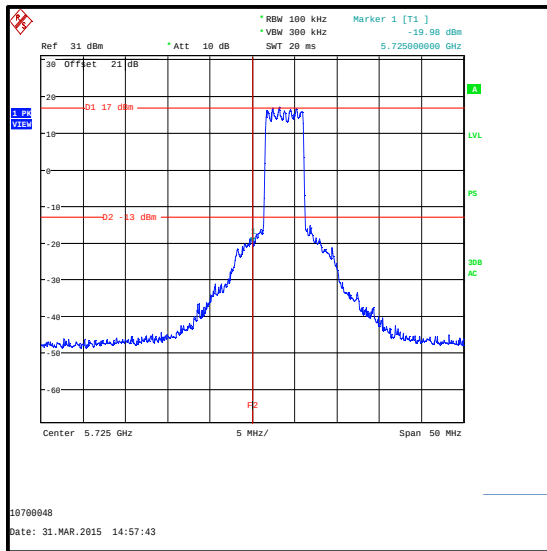
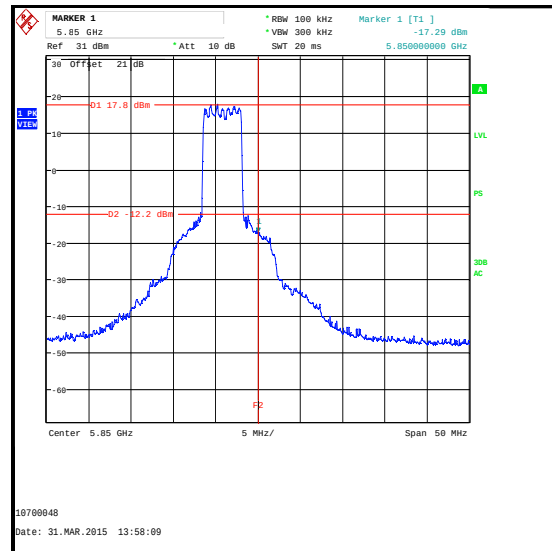
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.920	-12.4	-11.8	0.6	Complied
5725	-14.4	-11.8	2.6	Complied
5850	-15.1	-12.1	3.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

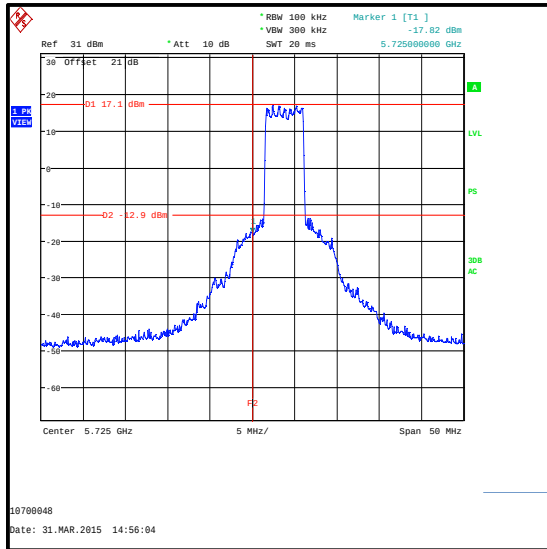
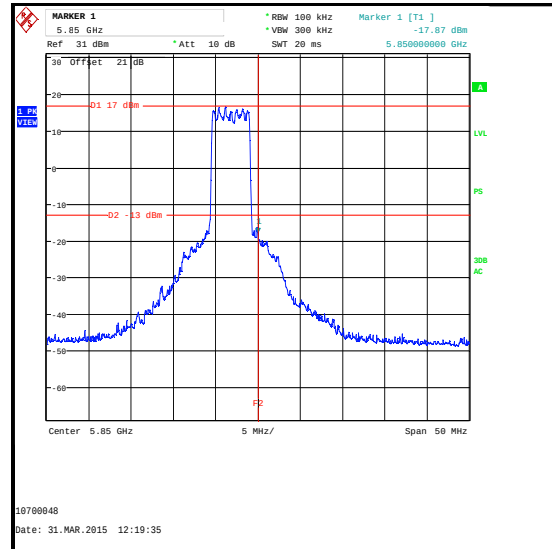
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-20.0	-13.0	7.0	Complied
5850	-17.3	-12.2	5.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

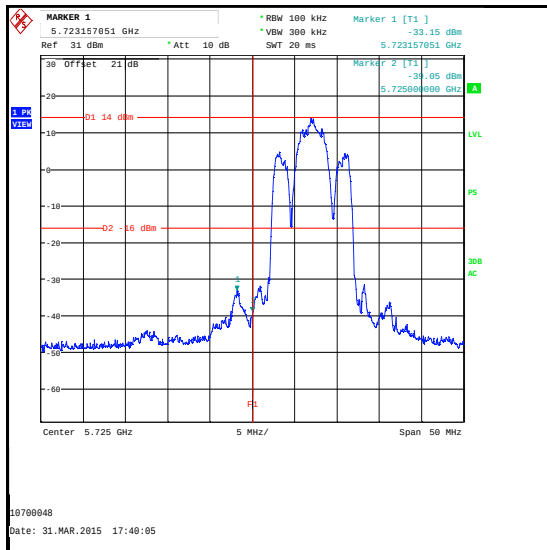
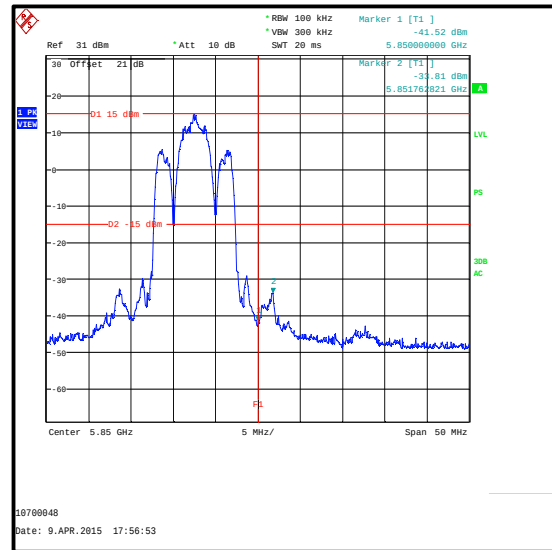
Band Edge Conducted Emissions (continued)**Results: 5 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-17.8	-12.9	4.9	Complied
5850	-17.9	-13.0	4.9	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

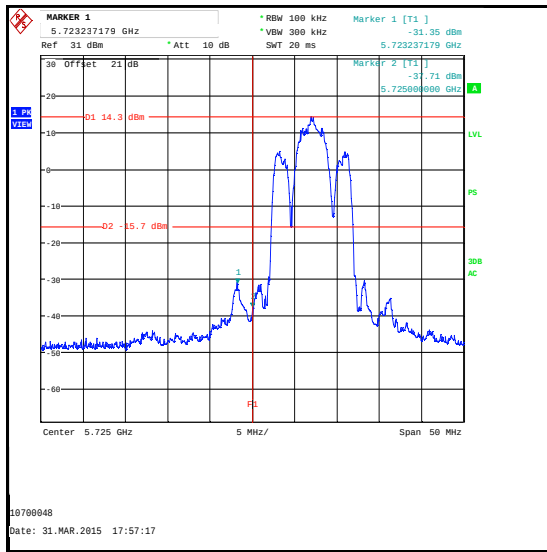
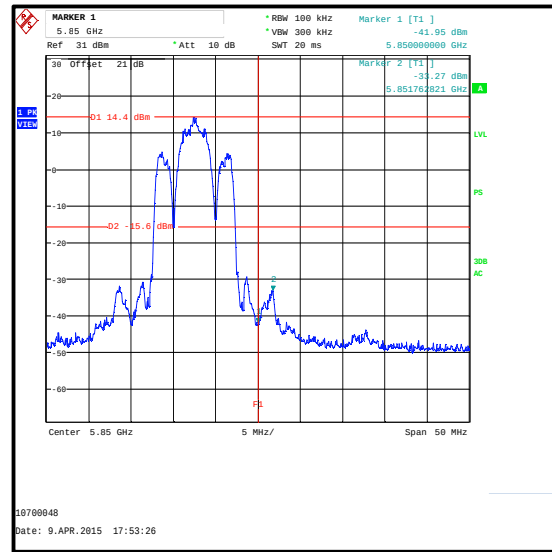
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.157	-33.1	-16.0	17.1	Complied
5725	-39.0	-16.0	23.0	Complied
5850	-41.5	-15.0	26.5	Complied
5851.763	-33.8	-15.0	18.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

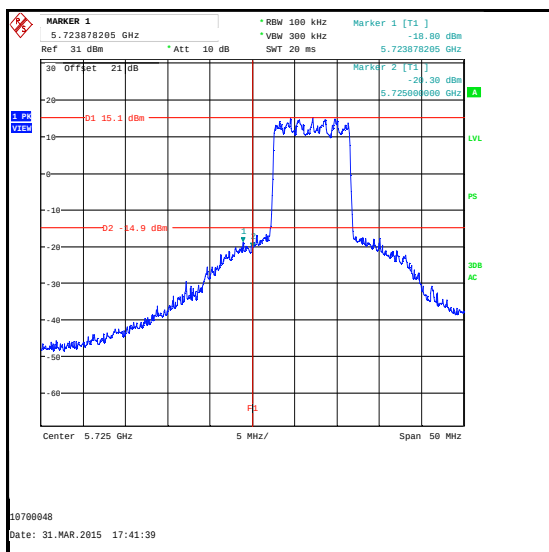
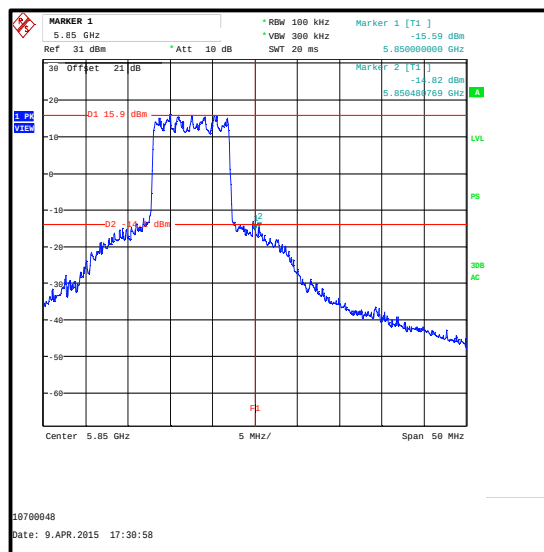
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / AQU / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.237	-31.3	-15.7	15.6	Complied
5725	-37.7	-15.7	22.0	Complied
5850	-41.9	-15.6	26.3	Complied
5851.763	-33.3	-15.6	17.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

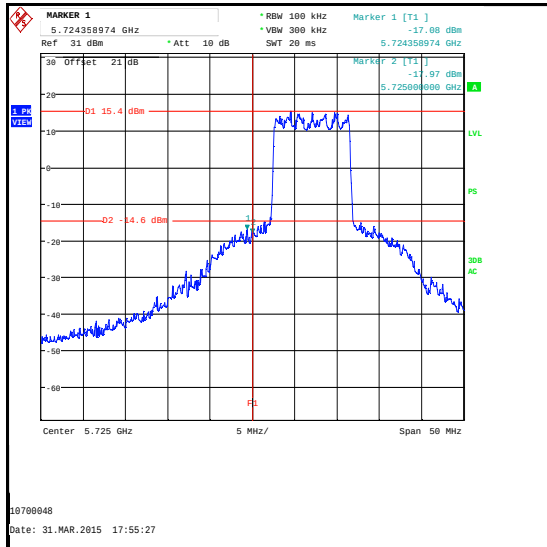
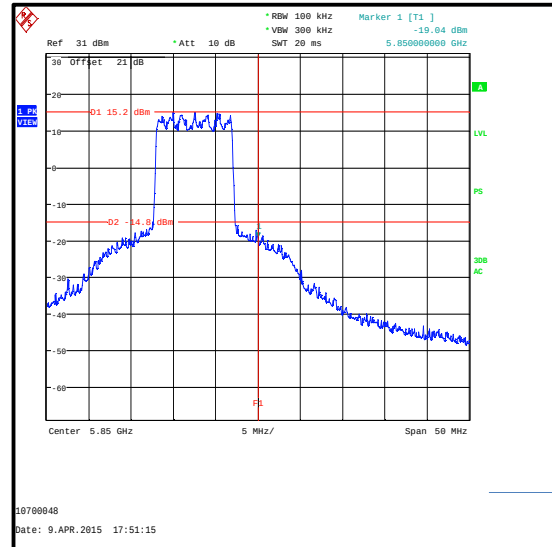
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / BPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.878	-18.8	-14.9	3.9	Complied
5725	-20.3	-14.9	5.4	Complied
5850	-15.6	-14.1	1.5	Complied
5850.481	-14.8	-14.1	0.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

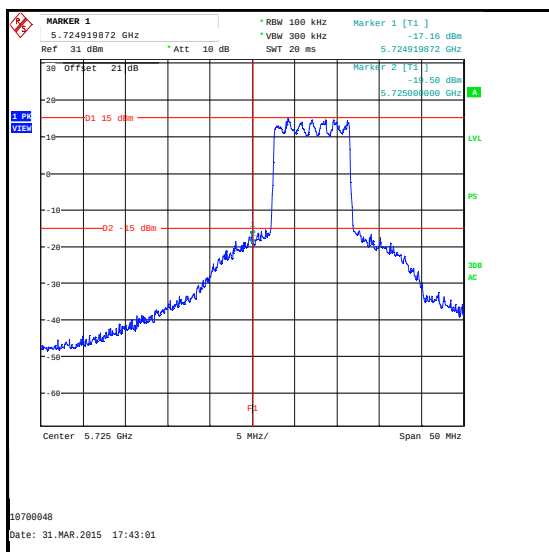
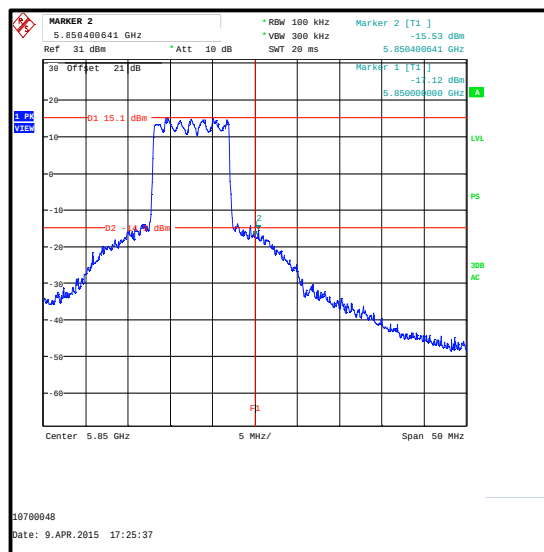
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / BPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.359	-17.1	-14.6	2.5	Complied
5725	-18.0	-14.6	3.4	Complied
5850	-19.0	-14.8	4.2	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

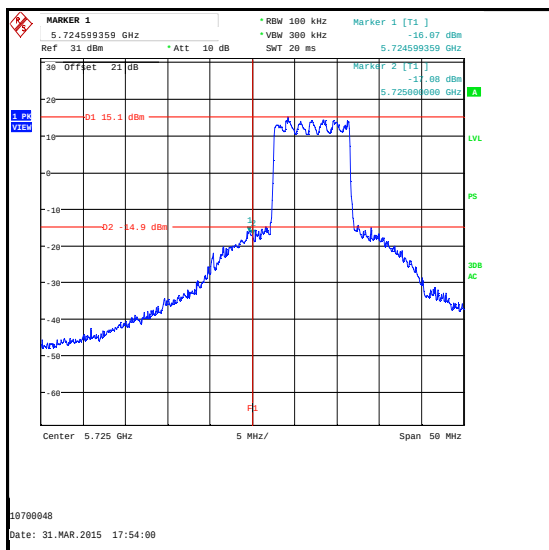
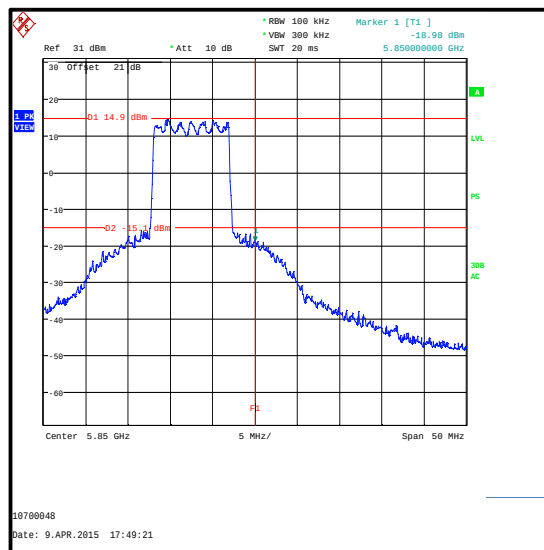
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / QPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.920	-17.2	-15.0	2.2	Complied
5725	-19.5	-15.0	4.5	Complied
5850	-17.1	-14.9	2.2	Complied
5850.401	-15.5	-14.9	0.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

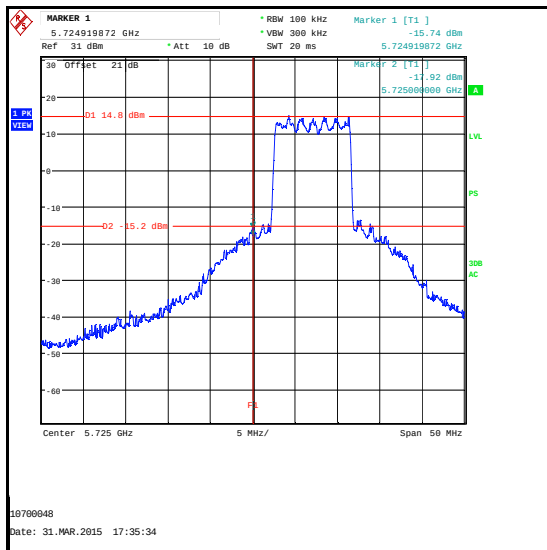
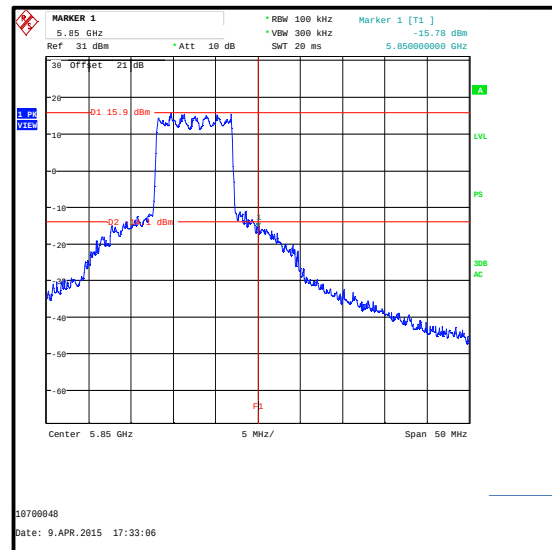
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.599	-16.1	-14.9	1.2	Complied
5725	-17.1	-14.9	2.2	Complied
5850	-19.0	-15.1	3.9	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

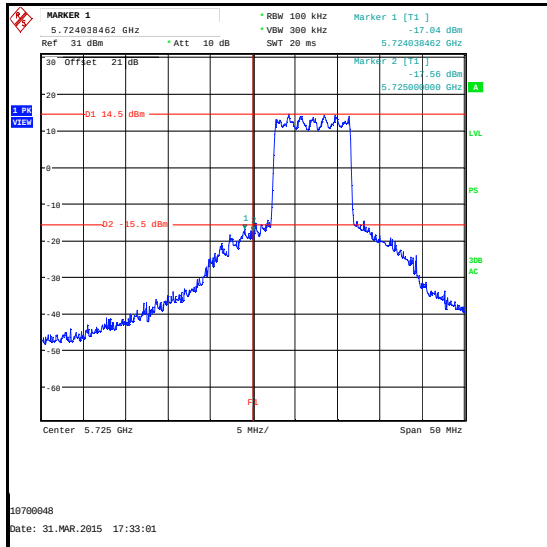
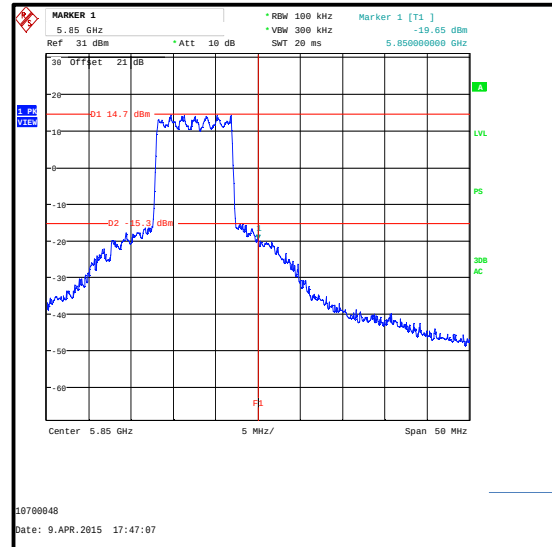
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.920	-15.7	-15.2	0.5	Complied
5725	-17.9	-15.2	2.7	Complied
5850	-15.8	-14.1	1.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

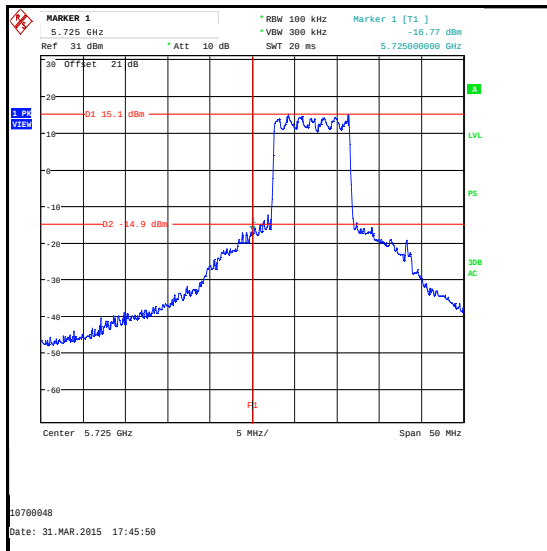
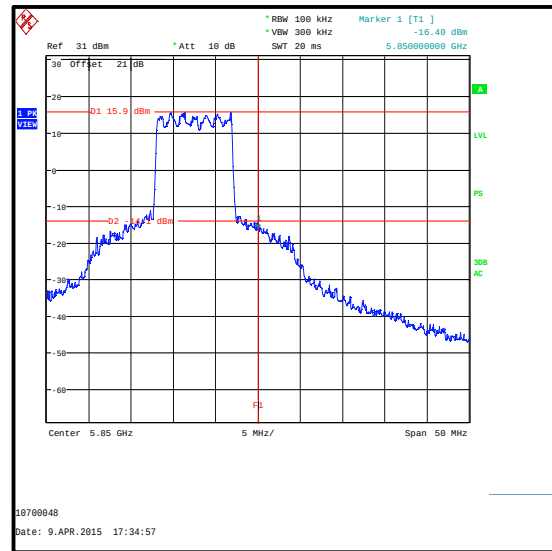
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.038	-17.0	-15.5	1.5	Complied
5725	-17.6	-15.5	2.1	Complied
5850	-19.6	-15.3	4.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

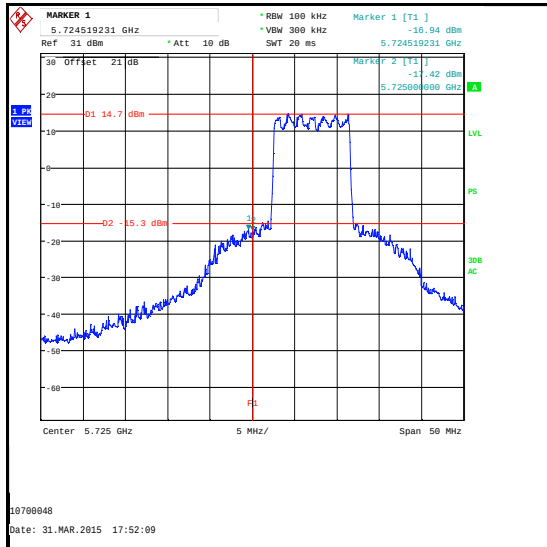
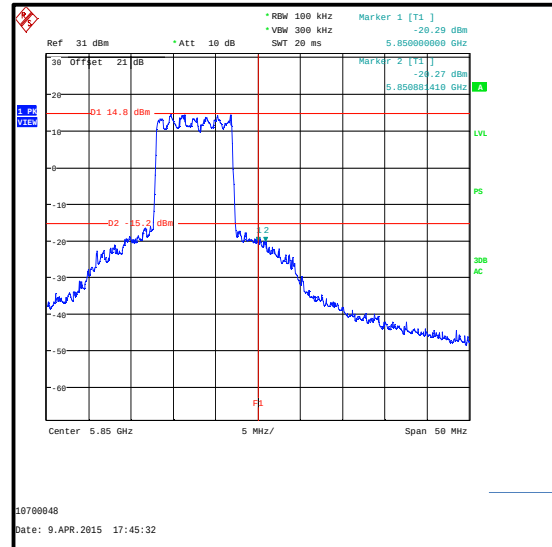
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-16.8	-14.9	1.9	Complied
5850	-16.4	-14.1	2.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

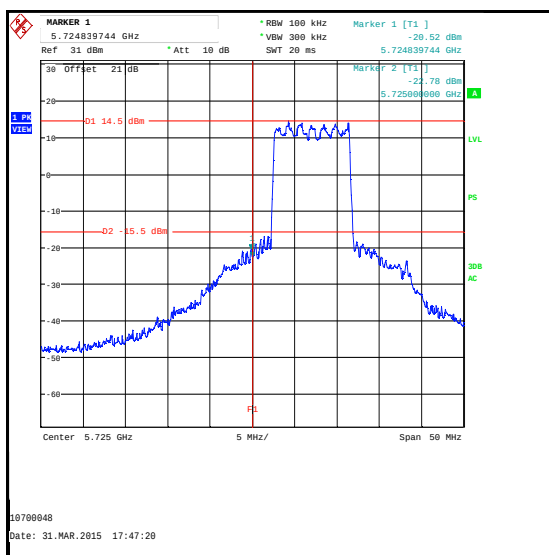
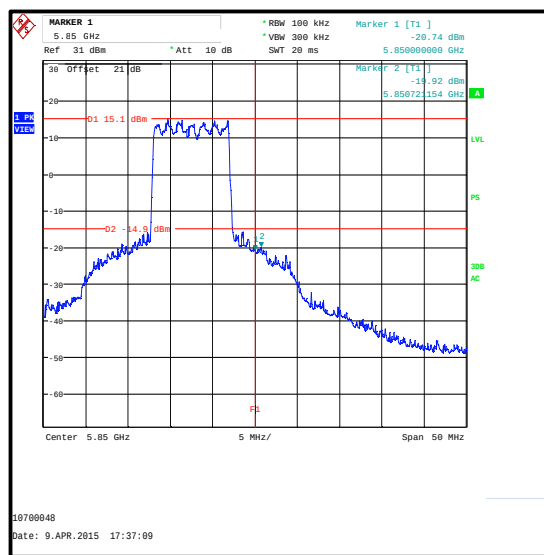
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.519	-16.9	-15.3	1.6	Complied
5725	-17.4	-15.3	2.1	Complied
5850	-20.3	-15.2	5.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

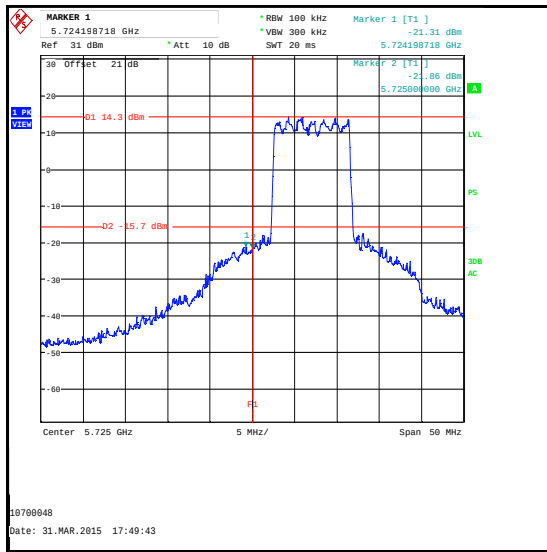
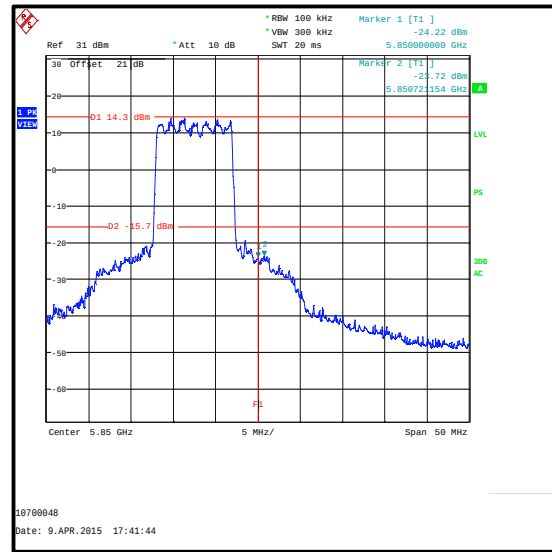
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-20.5	-15.5	5.0	Complied
5725	-22.8	-15.5	7.3	Complied
5850	-20.7	-14.9	5.8	Complied
5850.721	-19.9	-14.9	5.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

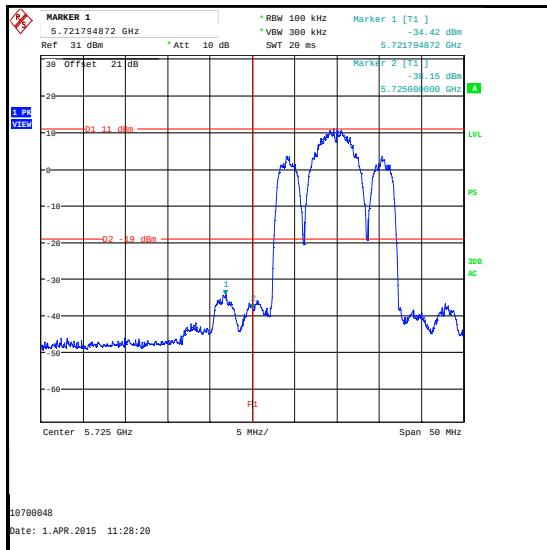
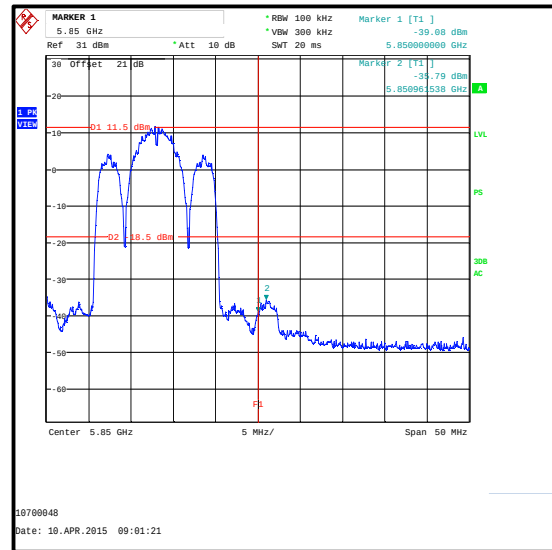
Band Edge Conducted Emissions (continued)**Results: 10 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.199	-21.3	-15.7	5.6	Complied
5725	-21.9	-15.7	6.2	Complied
5850	-24.2	-15.7	8.5	Complied
5850.721	-23.7	-15.7	8.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

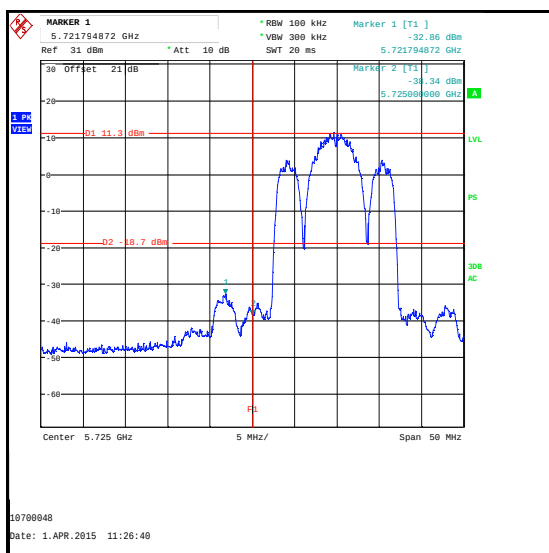
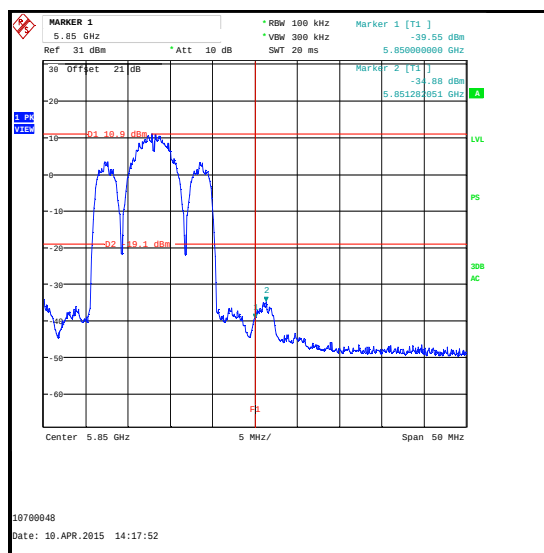
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5721.795	-34.4	-19.0	15.4	Complied
5725	-38.1	-19.0	19.1	Complied
5850	-39.1	-18.5	20.6	Complied
5850.962	-35.8	-18.5	17.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

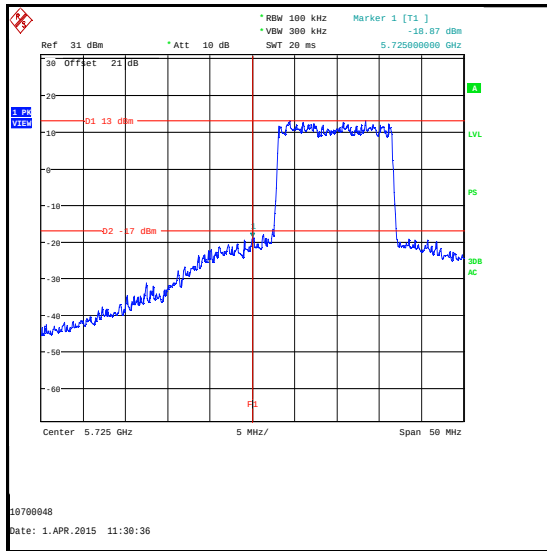
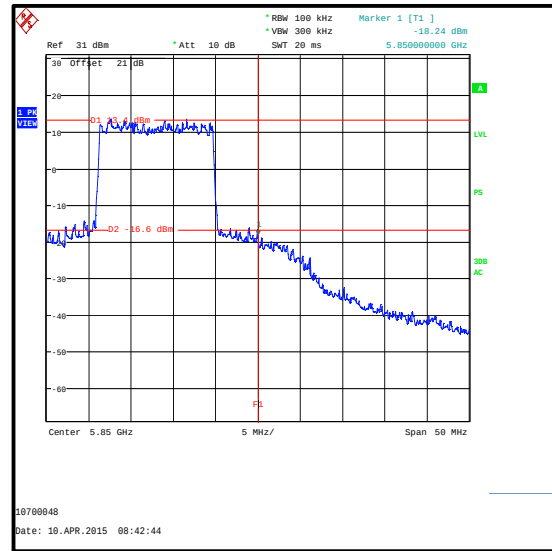
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / AQU / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5721.795	-32.9	-18.7	14.2	Complied
5725	-38.3	-18.7	19.6	Complied
5850	-39.5	-19.1	20.4	Complied
5851.282	-34.9	-19.1	15.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

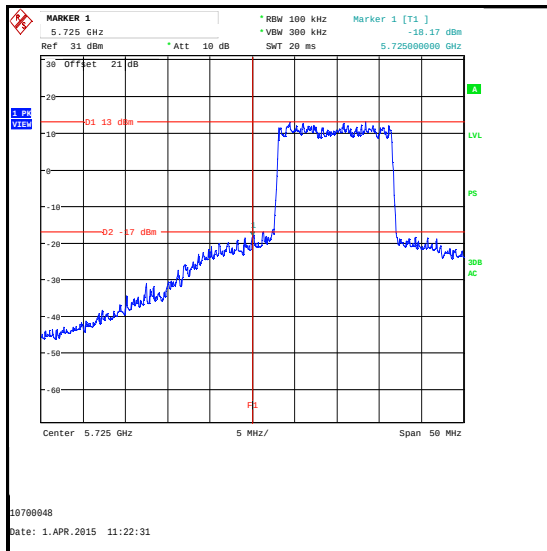
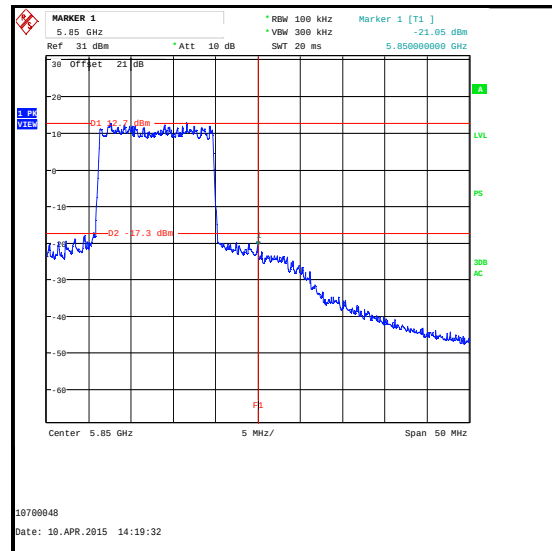
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / BPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-18.9	-17.0	1.9	Complied
5850	-18.2	-16.6	1.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / BPSK / V Port**

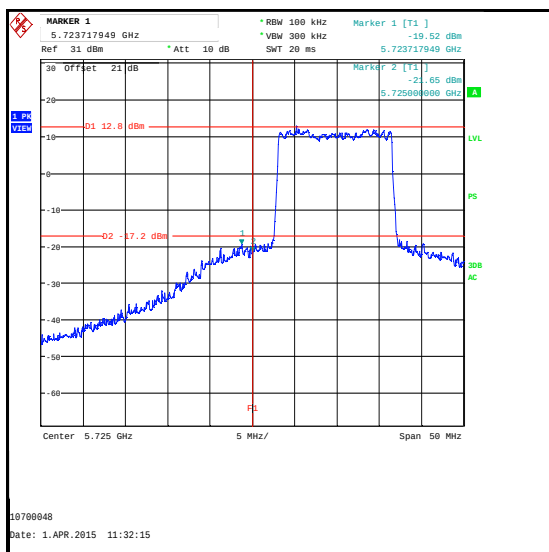
Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-18.2	-17.0	1.2	Complied
5850	-21.0	-17.3	3.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

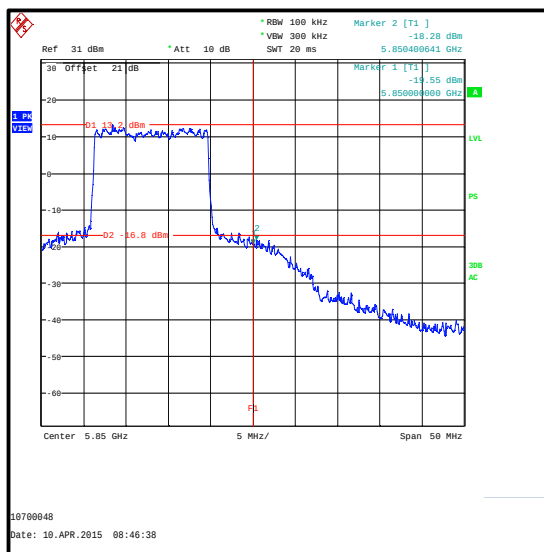
Band Edge Conducted Emissions (continued)

Results: 15 MHz Channel / QPSK / H Port

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.718	-19.5	-17.2	2.3	Complied
5725	-21.6	-17.2	4.4	Complied
5850	-19.5	-16.8	2.7	Complied
5850.401	-18.3	-16.8	1.5	Complied



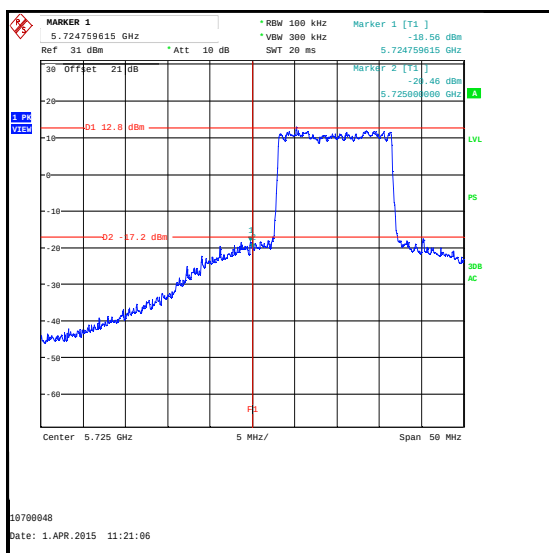
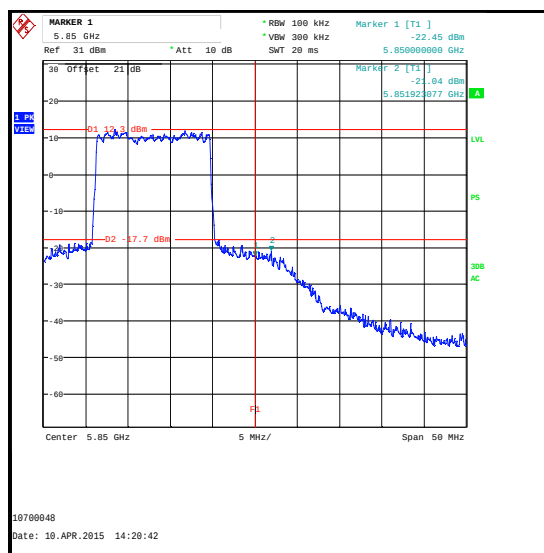
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement

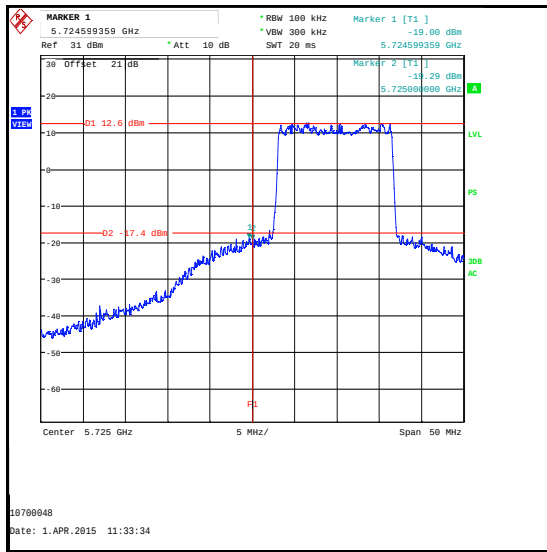
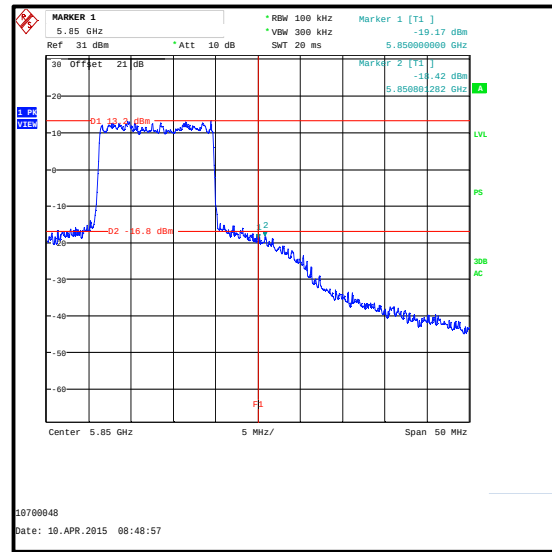
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.760	-18.6	-17.2	1.4	Complied
5725	-20.5	-17.2	3.3	Complied
5850	-22.4	-17.7	4.7	Complied
5851.923	-21.0	-17.7	3.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

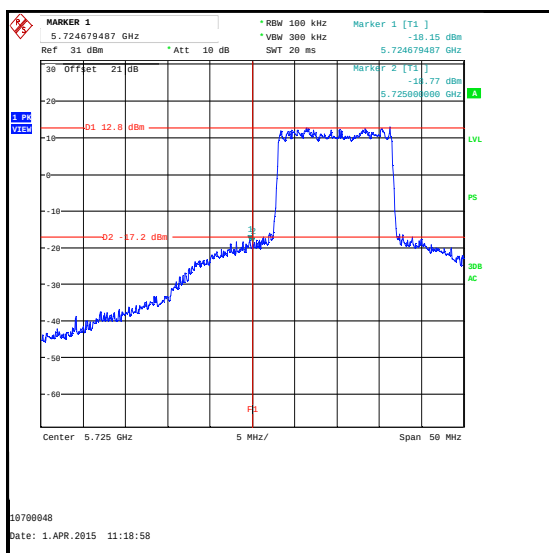
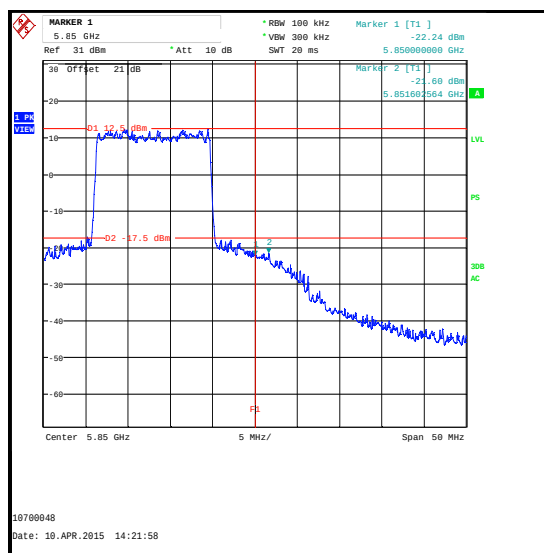
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.599	-19.0	-17.4	1.6	Complied
5725	-19.3	-17.4	1.9	Complied
5850	-19.2	-16.8	2.4	Complied
5850.801	-18.4	-16.8	1.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

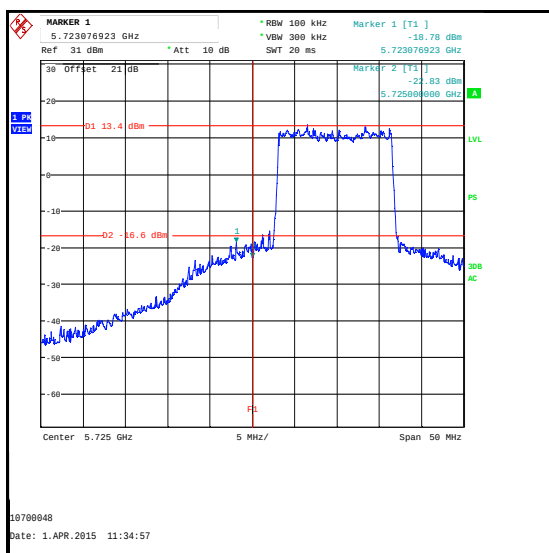
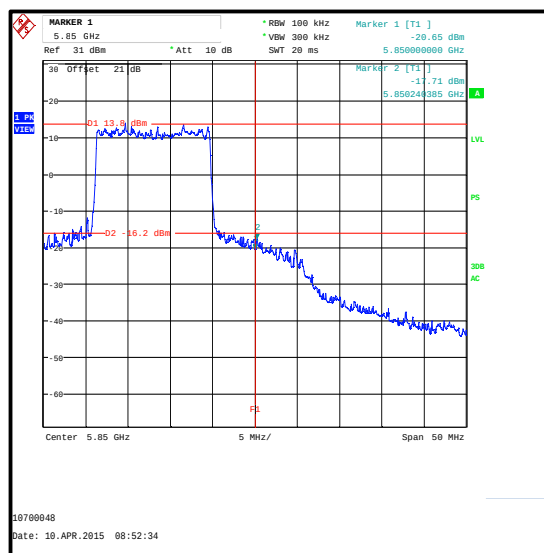
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.679	-18.1	-17.2	0.9	Complied
5725	-18.8	-17.2	1.6	Complied
5850	-22.2	-17.5	4.7	Complied
5851.603	-21.6	-17.5	4.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

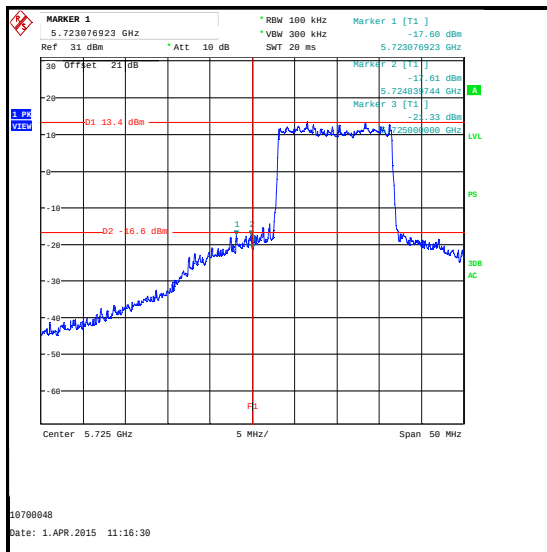
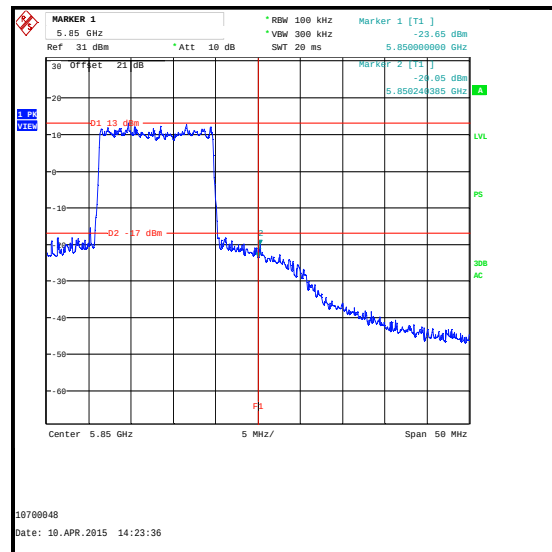
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.077	-18.8	-16.6	2.2	Complied
5725	-22.8	-16.6	6.2	Complied
5850	-20.6	-16.2	4.4	Complied
5850.240	-17.7	-16.2	1.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

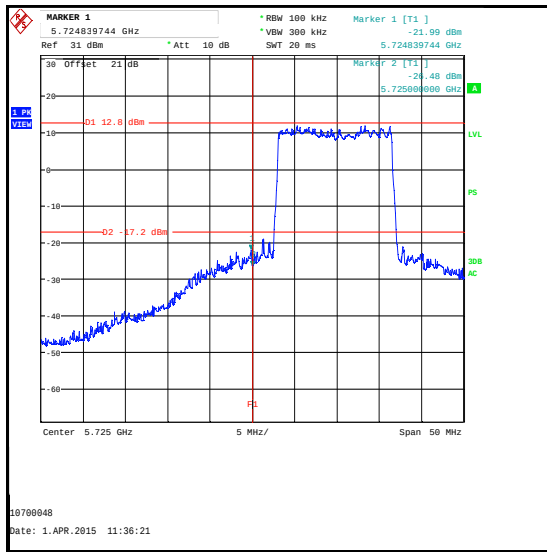
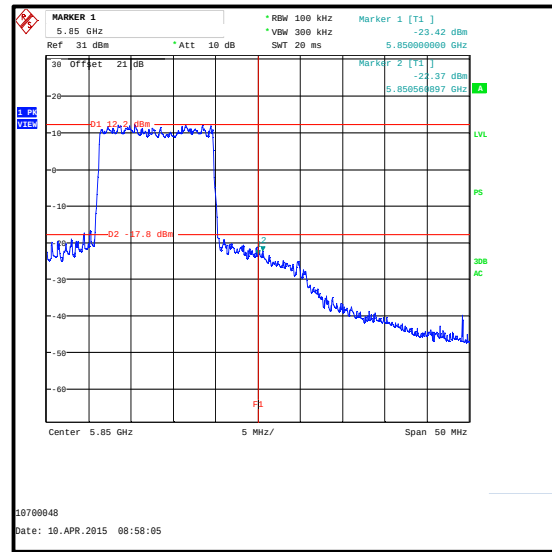
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.077	-17.6	-16.6	1.0	Complied
5724.840	-17.6	-16.6	1.0	Complied
5725	-21.3	-16.6	4.7	Complied
5850	-23.6	-17.0	6.6	Complied
5850.240	-20.0	-17.0	3.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

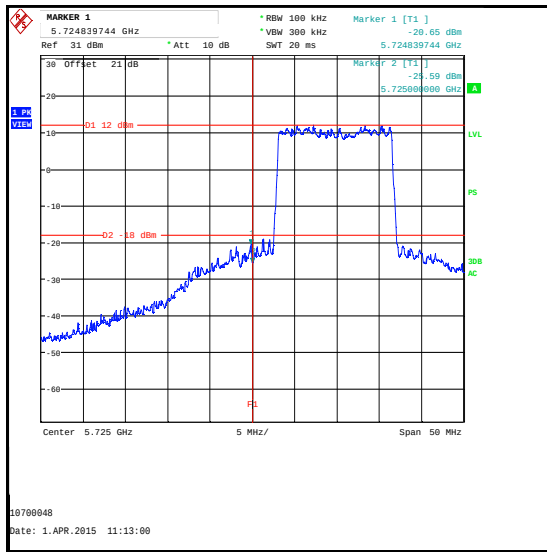
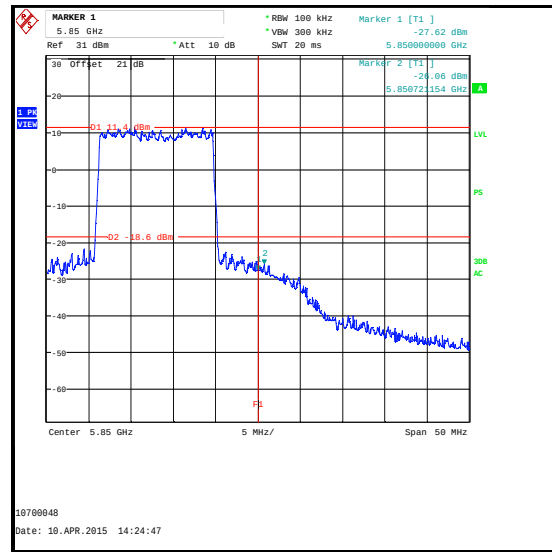
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-22.0	-17.2	4.8	Complied
5725	-26.5	-17.2	9.3	Complied
5850	-23.4	-17.8	5.6	Complied
5850.561	-22.4	-17.8	4.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

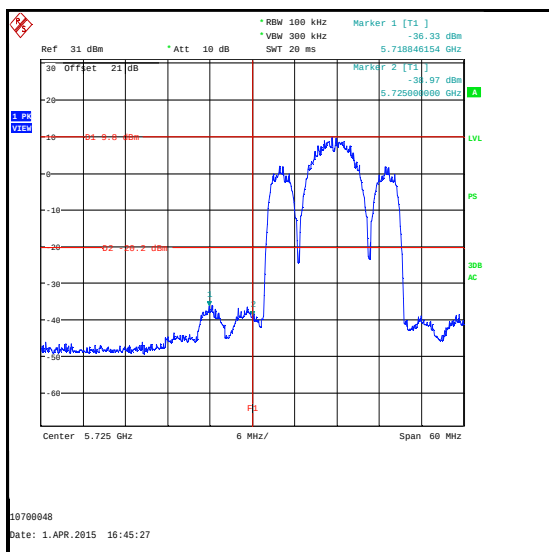
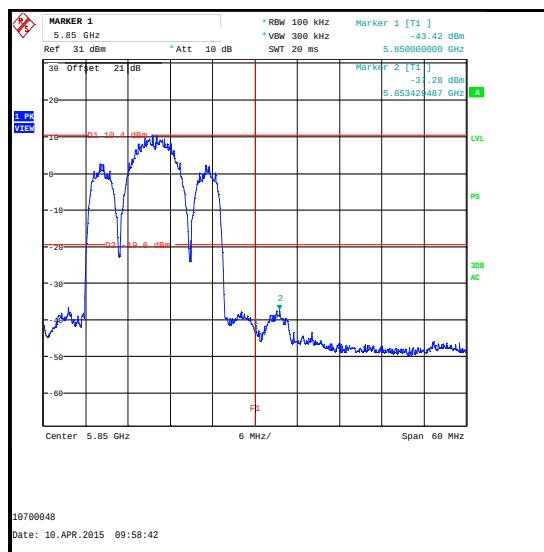
Band Edge Conducted Emissions (continued)**Results: 15 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-20.6	-18.0	2.6	Complied
5725	-25.6	-18.0	7.6	Complied
5850	-27.6	-18.6	9.0	Complied
5850.721	-26.1	-18.6	7.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

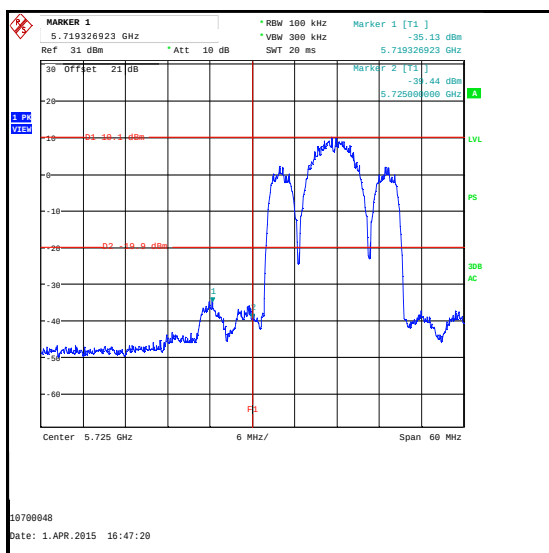
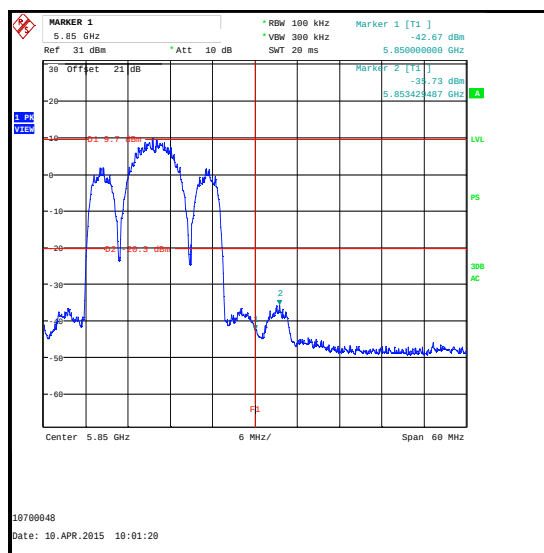
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5718.846	-36.3	-20.2	16.1	Complied
5725	-39.0	-20.2	18.8	Complied
5850	-43.4	-19.6	23.8	Complied
5853.429	-37.3	-19.6	17.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

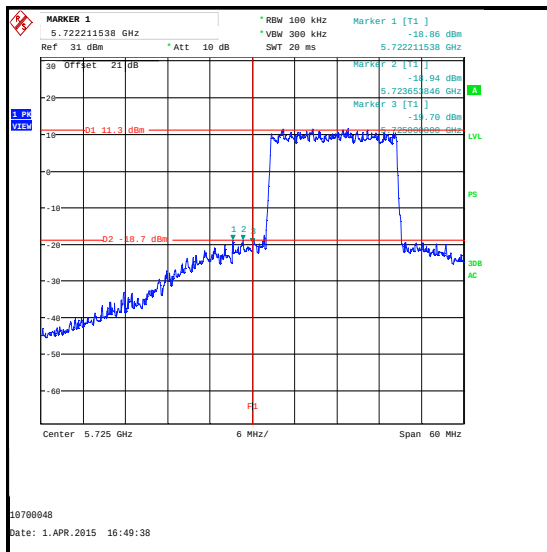
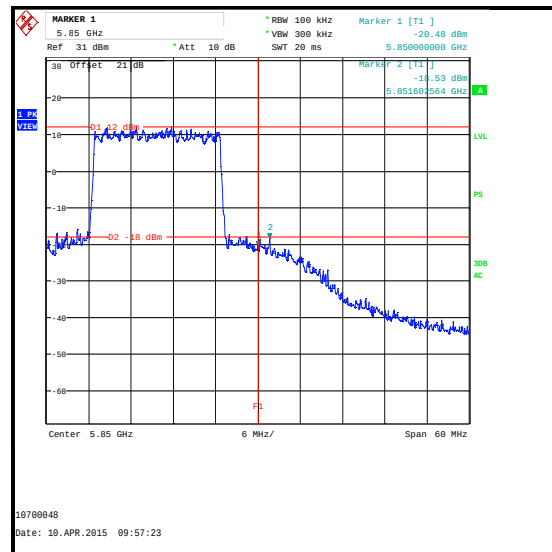
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / ACQ / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5719.327	-35.1	-19.9	15.2	Complied
5725	-39.4	-19.9	19.5	Complied
5850	-42.7	-20.3	22.4	Complied
5953.429	-35.7	-20.3	15.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

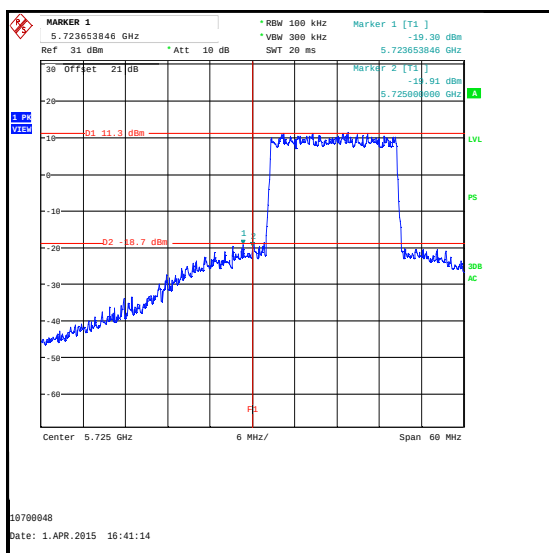
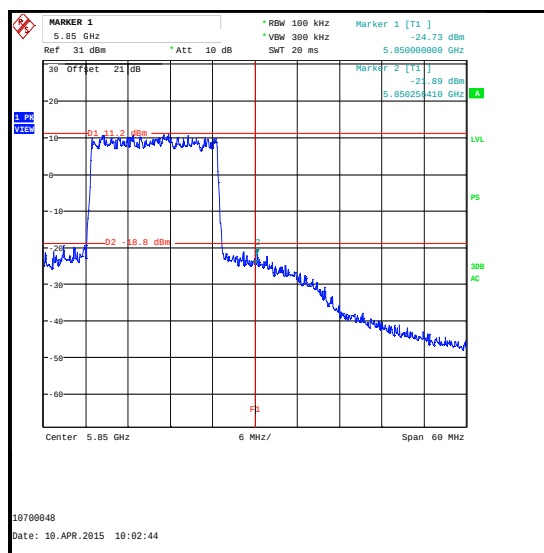
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / BPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5722.212	-18.9	-18.7	0.2	Complied
5723.654	-18.9	-18.7	0.2	Complied
5725	-19.7	-18.7	1.0	Complied
5850	-20.5	-18.0	2.5	Complied
5851.603	-18.5	-18.0	0.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

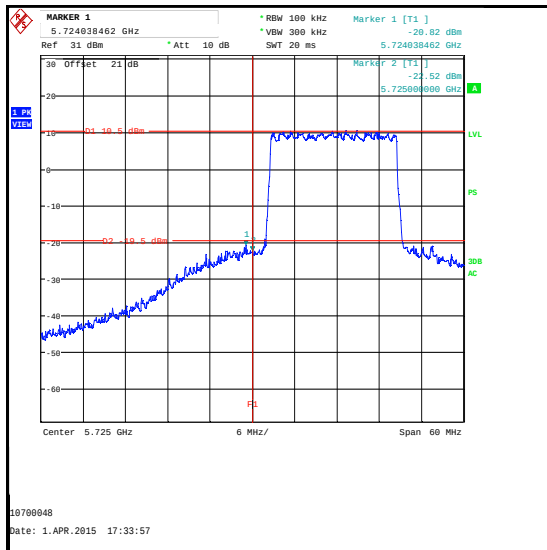
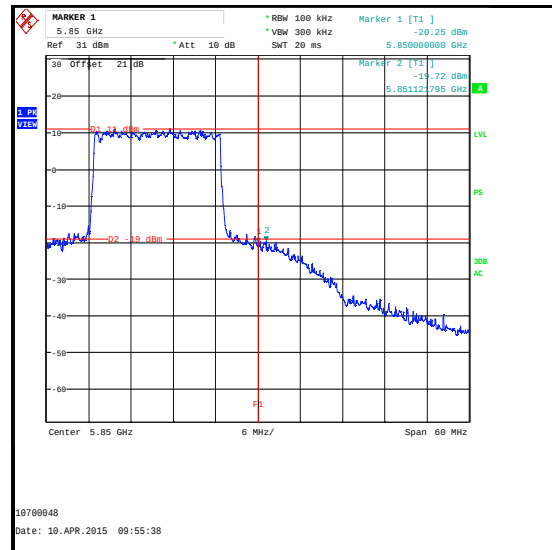
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / BPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.654	-19.3	-18.7	0.6	Complied
5725	-19.9	-18.7	1.2	Complied
5850	-24.7	-18.8	5.9	Complied
5850.256	-21.9	-18.8	3.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

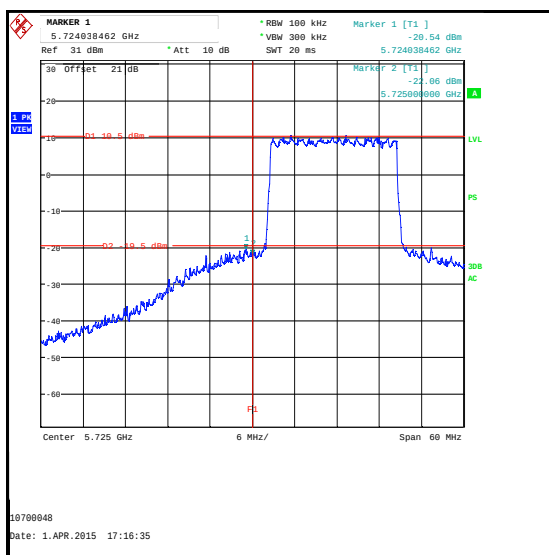
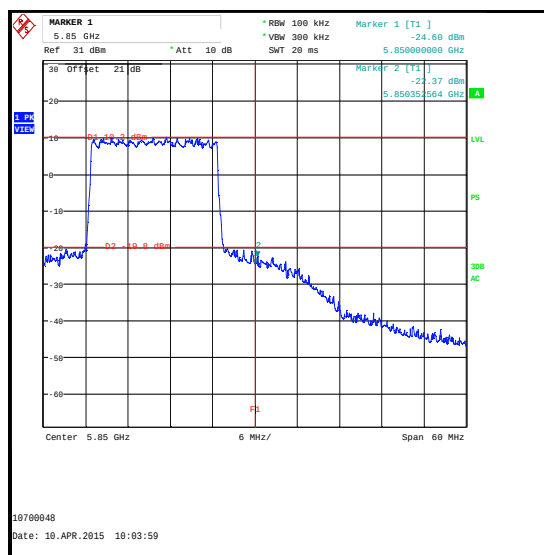
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / QPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.038	-20.8	-19.5	1.3	Complied
5725	-22.5	-19.5	3.0	Complied
5850	-20.2	-19.0	1.2	Complied
5851.122	-19.7	-19.0	0.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

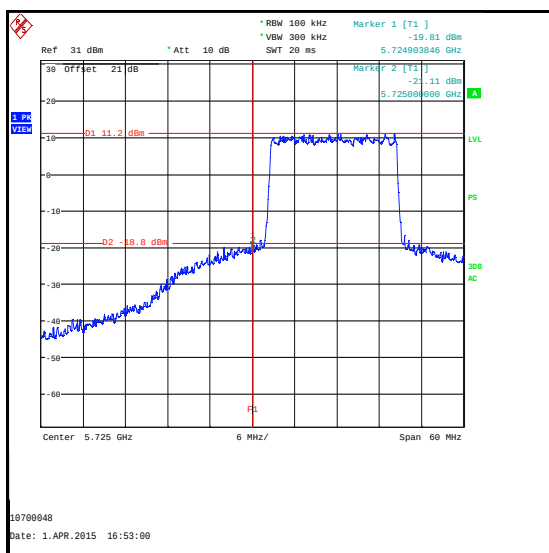
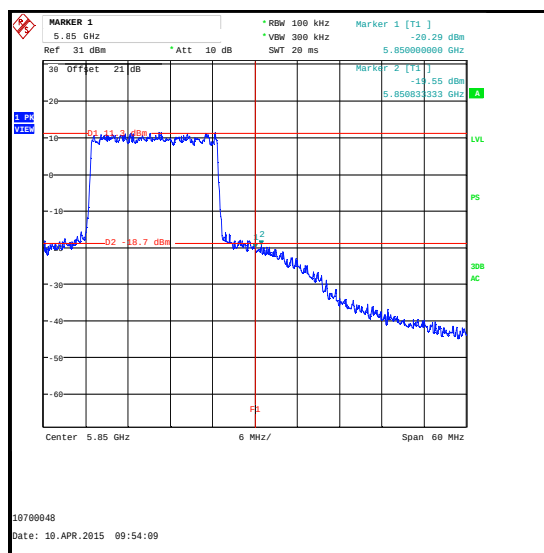
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.038	-20.5	-19.5	1.0	Complied
5725	-22.1	-19.5	2.6	Complied
5850	-24.6	-19.8	4.8	Complied
5850.353	-22.4	-19.8	2.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

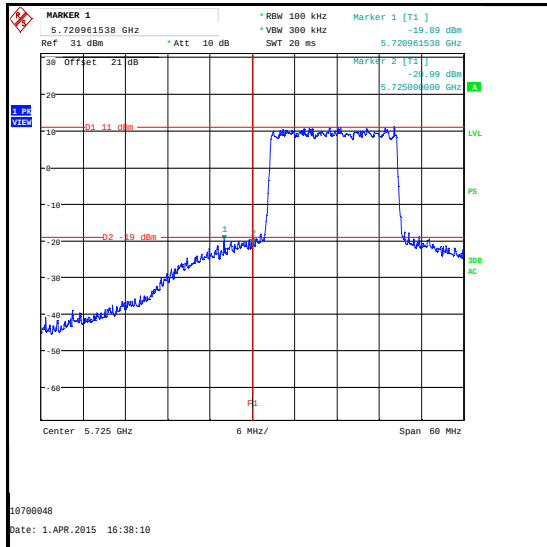
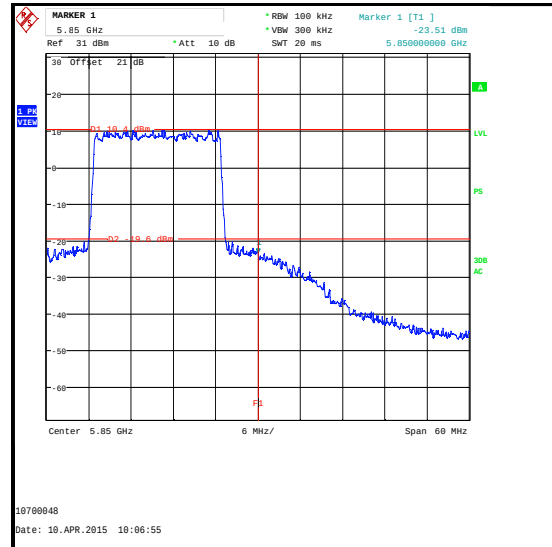
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.904	-19.8	-18.8	1.0	Complied
5725	-21.1	-18.8	2.3	Complied
5850	-20.3	-18.7	1.6	Complied
5850.833	-19.5	-18.7	0.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

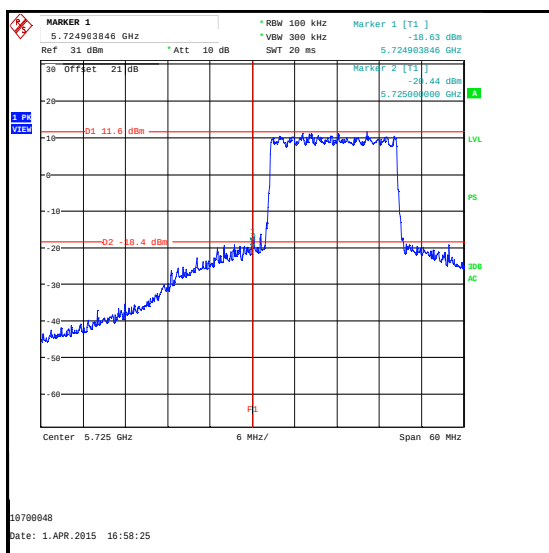
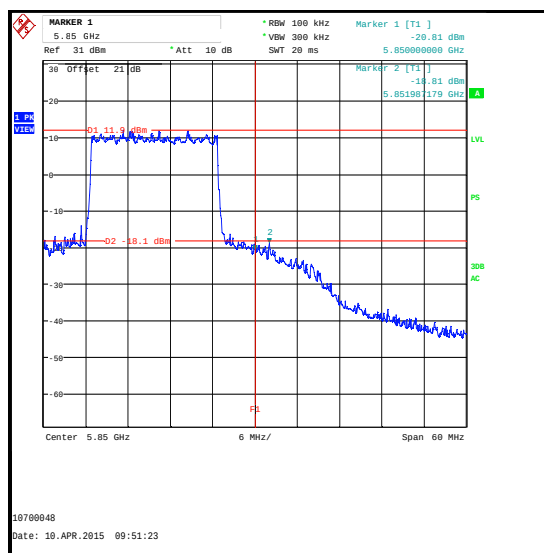
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5720.962	-19.9	-19.0	0.9	Complied
5725	-21.0	-19.0	2.0	Complied
5850	-23.5	-19.6	3.9	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

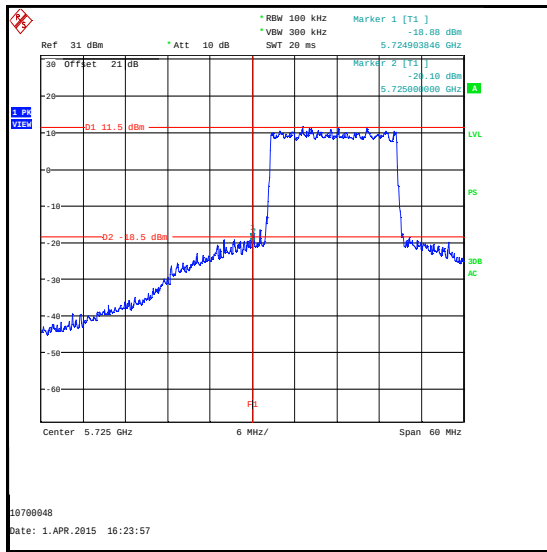
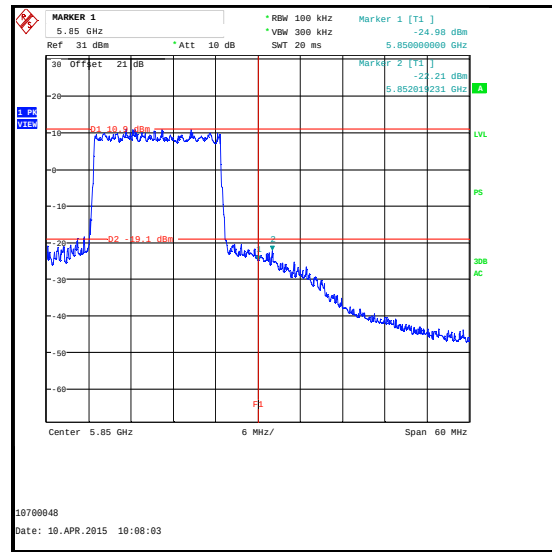
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.904	-18.6	-18.4	0.2	Complied
5725	-20.4	-18.4	2.0	Complied
5850	-20.8	-18.1	2.7	Complied
5851.987	-18.8	-18.1	0.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

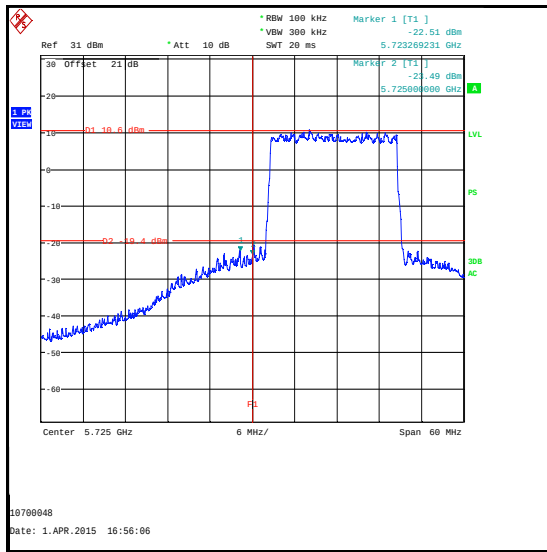
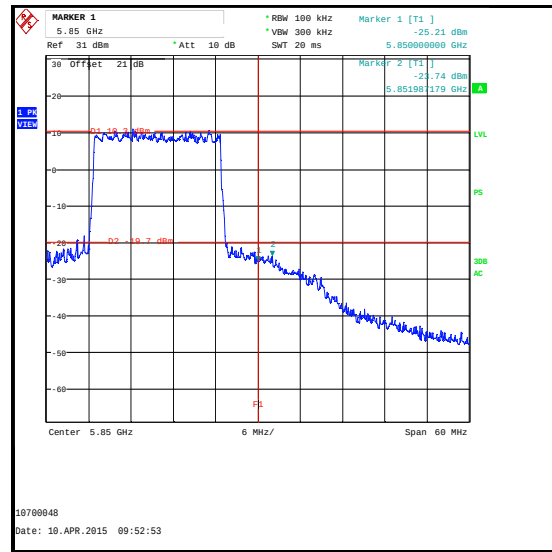
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.904	-18.9	-18.5	0.4	Complied
5725	-20.1	-18.5	1.6	Complied
5850	-25.0	-19.1	5.9	Complied
5852.019	-22.2	-19.1	3.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

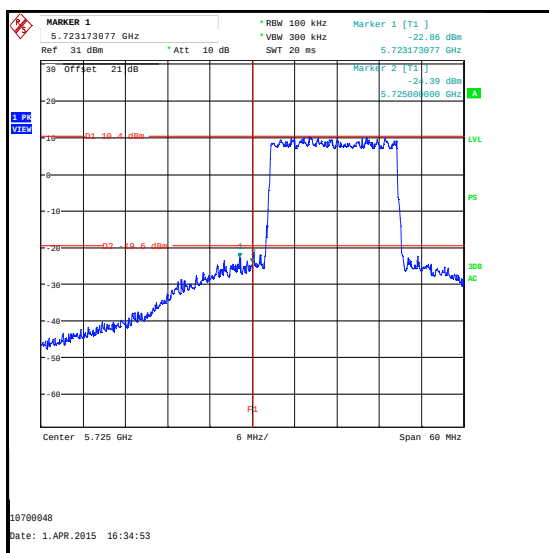
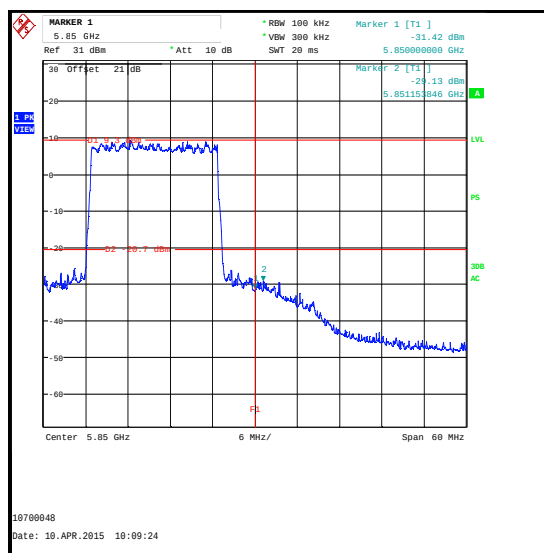
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.269	-22.5	-19.4	3.1	Complied
5725	-23.5	-19.4	4.1	Complied
5850	-25.2	-19.7	5.5	Complied
5851.987	-23.7	-19.7	4.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

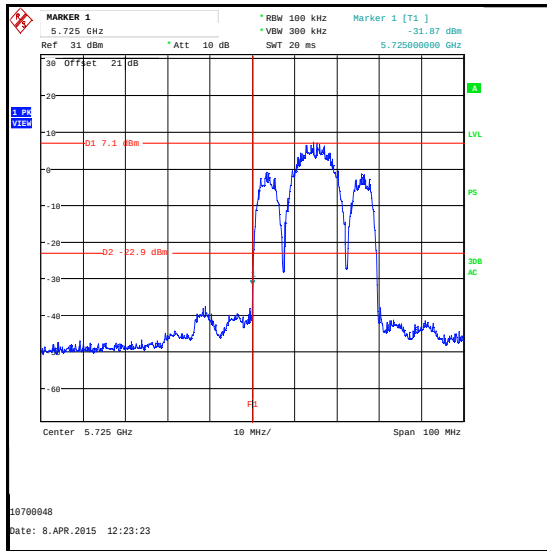
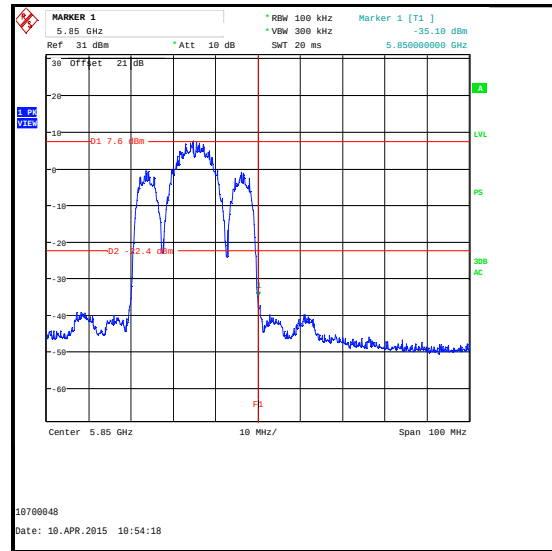
Band Edge Conducted Emissions (continued)**Results: 20 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.173	-22.9	-19.6	3.3	Complied
5725	-24.4	-19.6	4.8	Complied
5850	-31.4	-20.7	10.7	Complied
5851.154	-29.1	-20.7	8.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

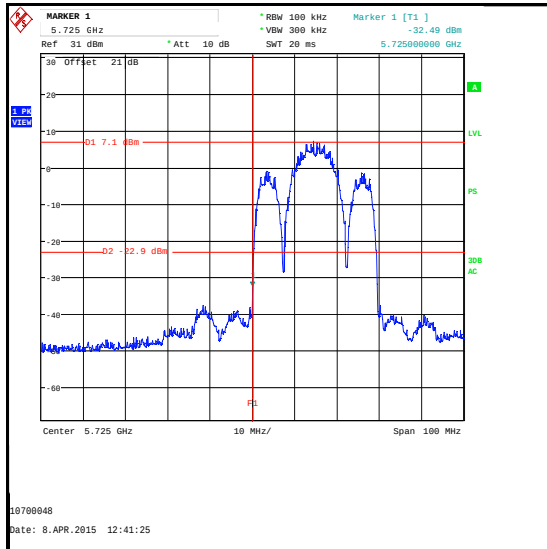
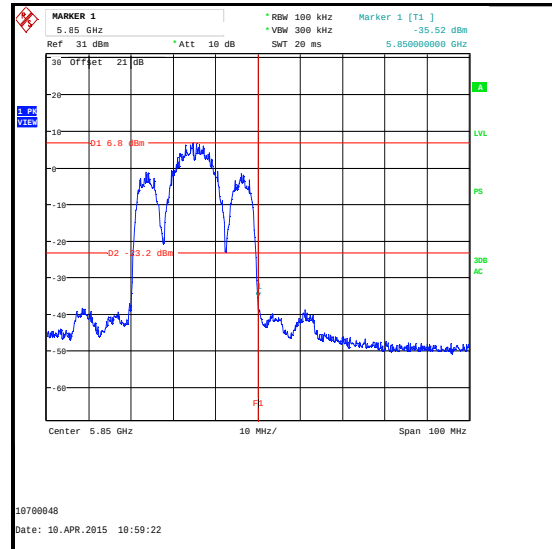
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-31.9	-22.9	9.0	Complied
5850	-35.1	-22.4	12.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

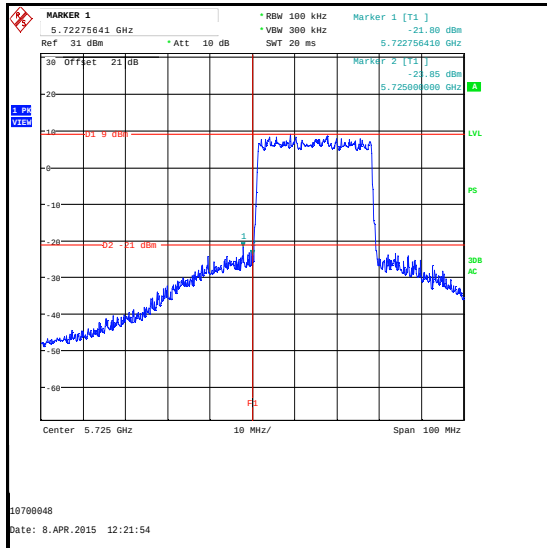
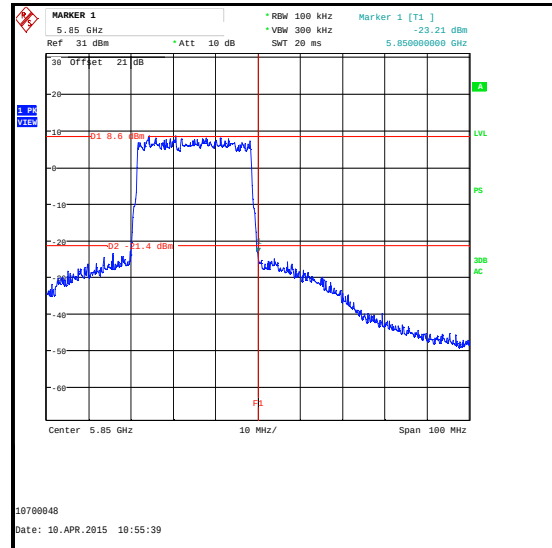
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / AQU / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-32.5	-22.9	9.6	Complied
5850	-35.5	-23.2	12.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

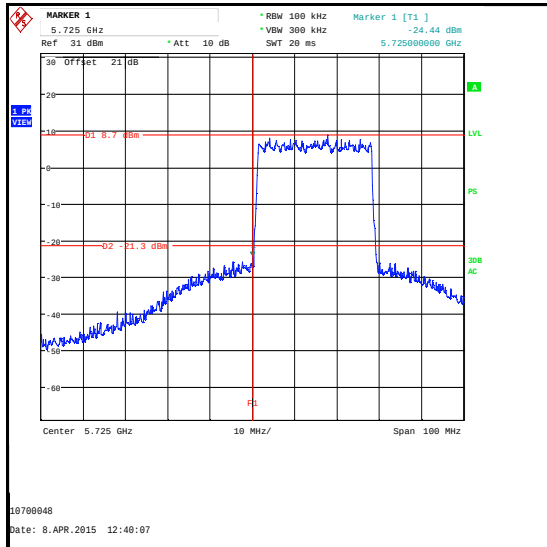
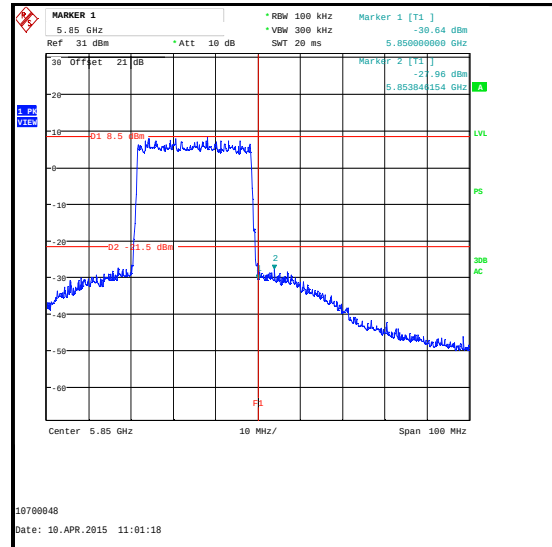
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / BPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5722.756	-21.8	-21.0	0.8	Complied
5725	-23.8	-21.0	2.8	Complied
5850	-23.2	-21.4	1.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

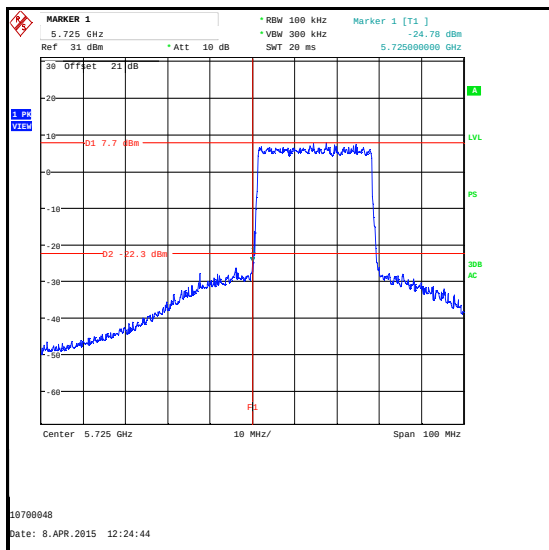
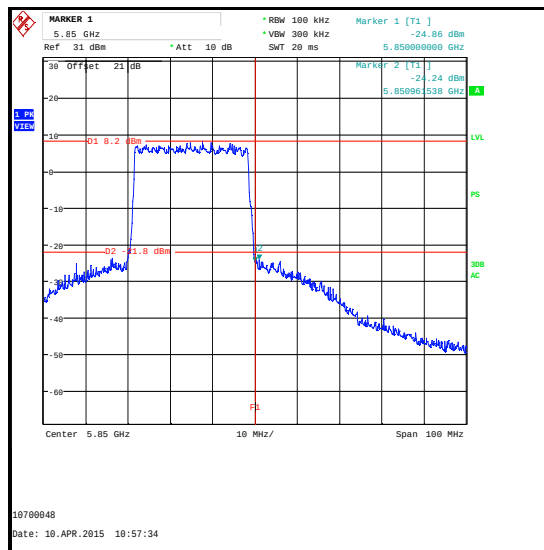
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / BPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-24.4	-21.3	3.1	Complied
5850	-30.6	-21.5	9.1	Complied
5853.846	-28.0	-21.5	6.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

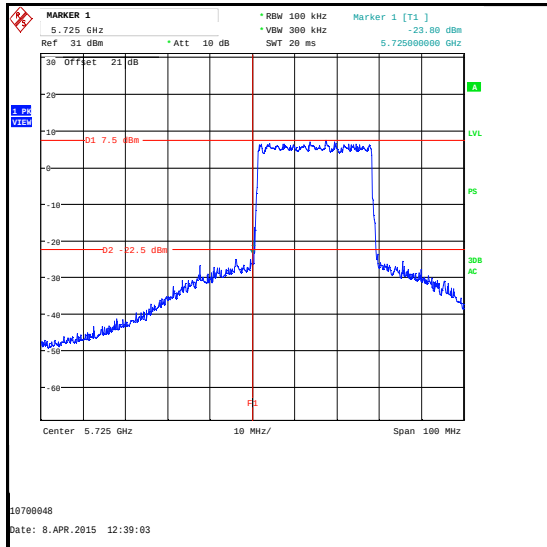
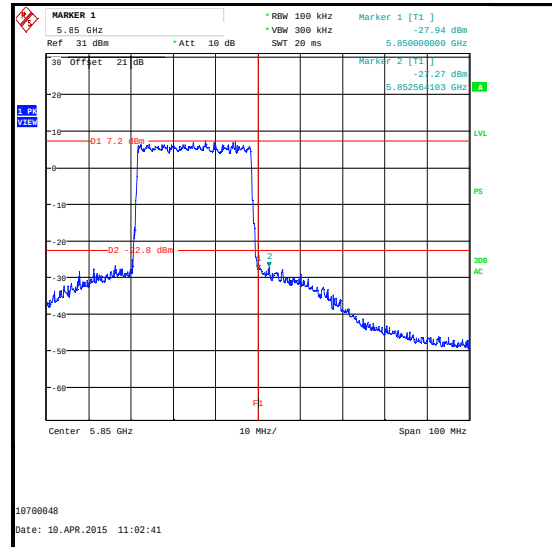
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / QPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-24.8	-22.3	2.5	Complied
5850	-24.9	-21.8	3.1	Complied
5850.962	-24.2	-21.8	2.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

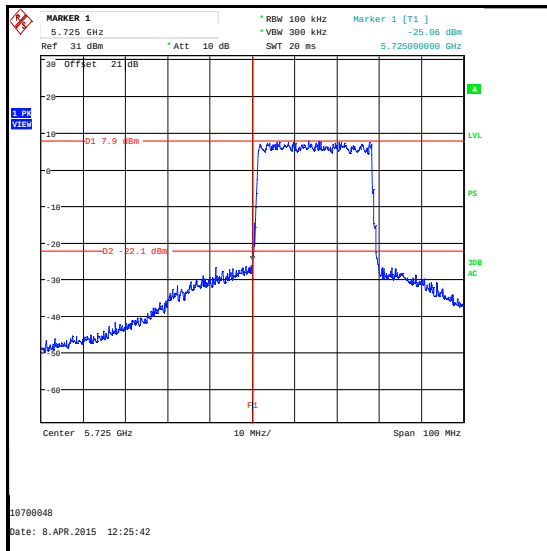
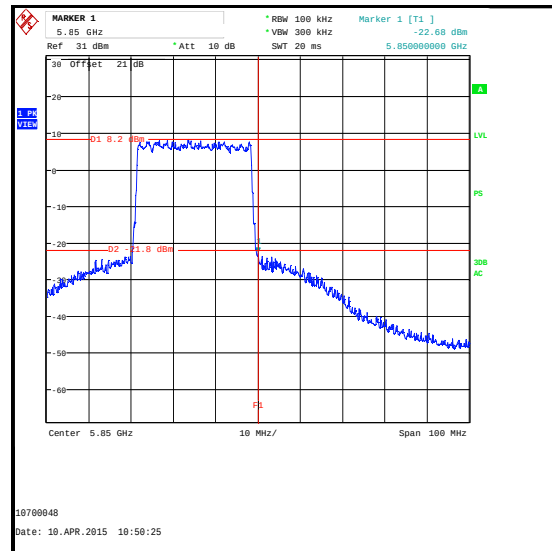
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-23.8	-22.5	1.3	Complied
5850	-27.9	-22.8	5.1	Complied
5852.564	-27.3	-22.8	4.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

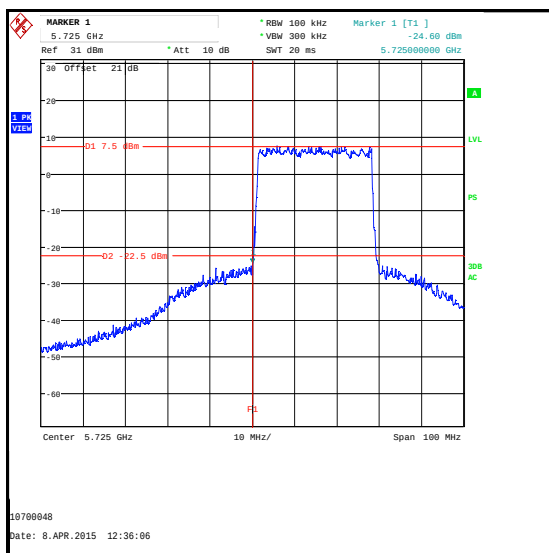
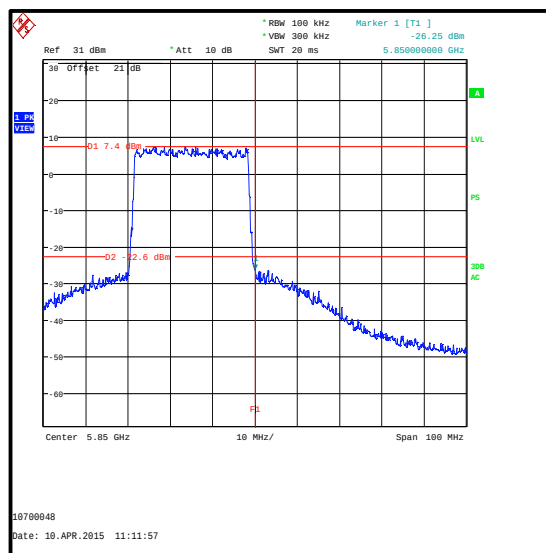
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-25.1	-22.1	3.0	Complied
5850	-22.7	-21.8	0.9	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

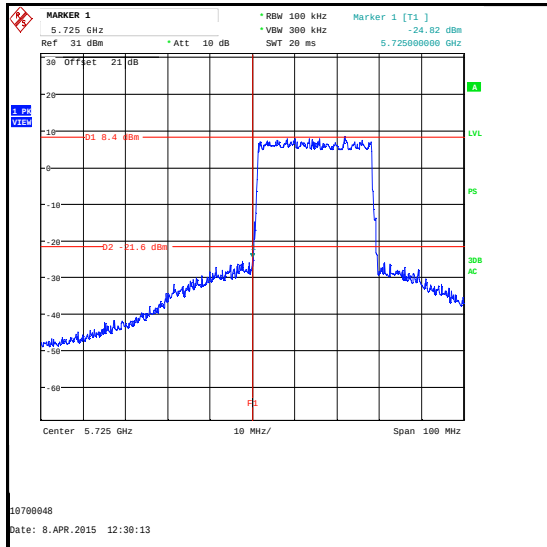
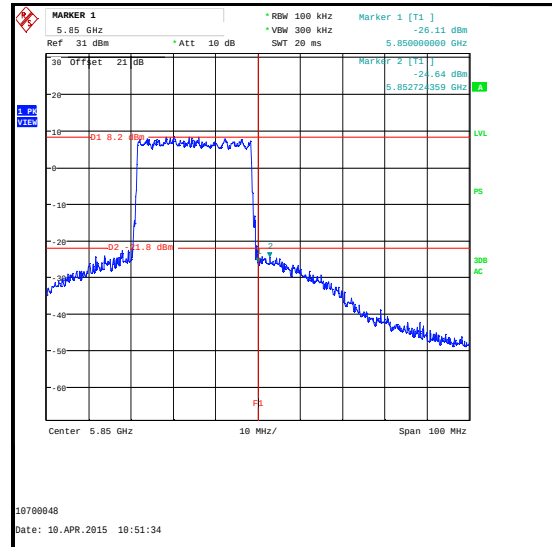
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-24.6	-22.5	2.1	Complied
5850	-26.2	-22.6	3.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

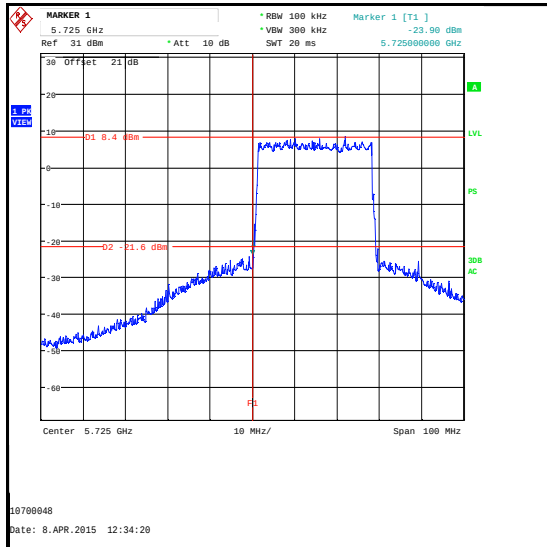
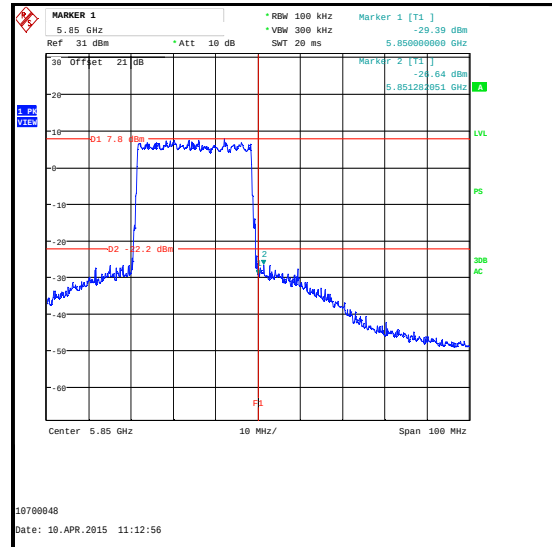
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-24.8	-21.6	3.2	Complied
5850	-26.1	-21.8	4.3	Complied
5852.724	-24.6	-21.8	2.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

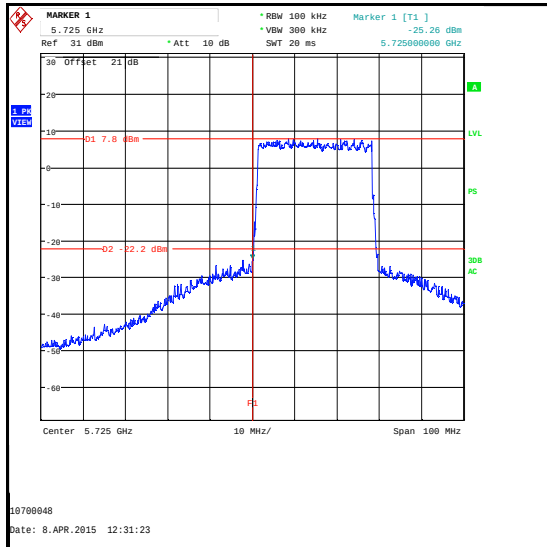
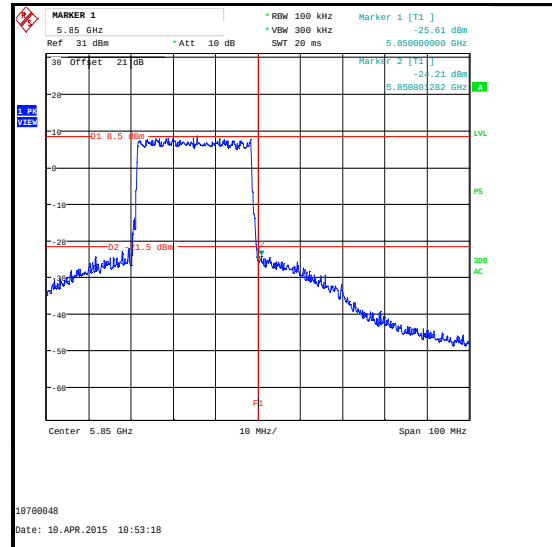
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-23.9	-21.6	2.3	Complied
5850	-29.4	-22.2	7.2	Complied
5851.282	-26.6	-22.2	4.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

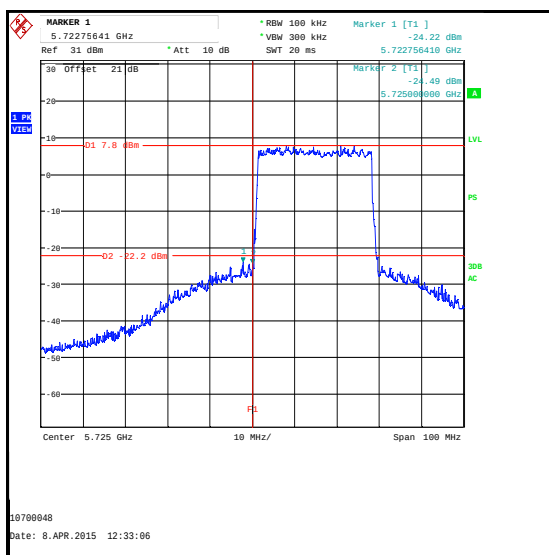
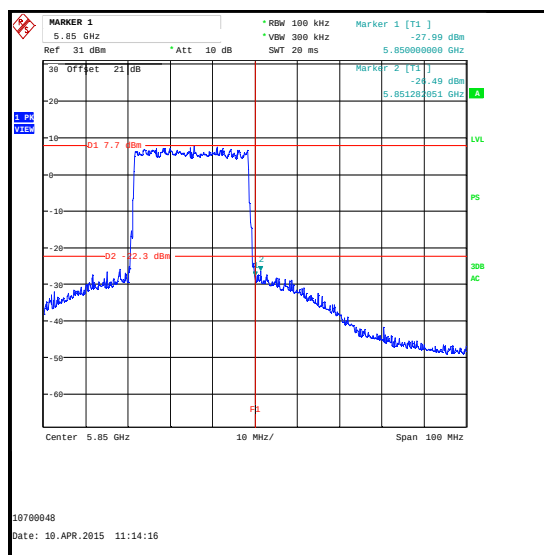
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-25.3	-22.2	3.1	Complied
5850	-25.6	-21.5	4.1	Complied
5850.801	-24.2	-21.5	2.7	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

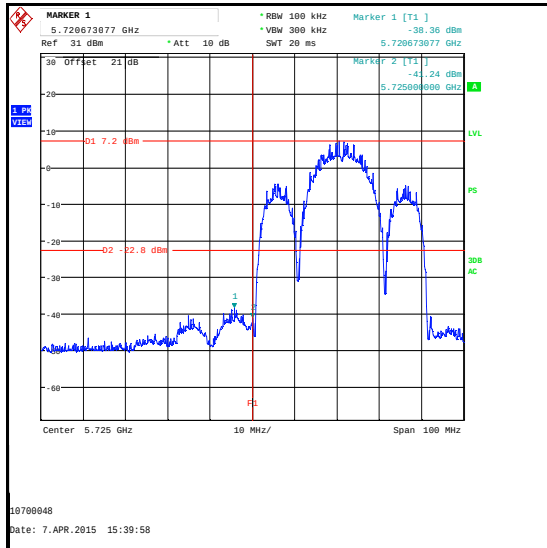
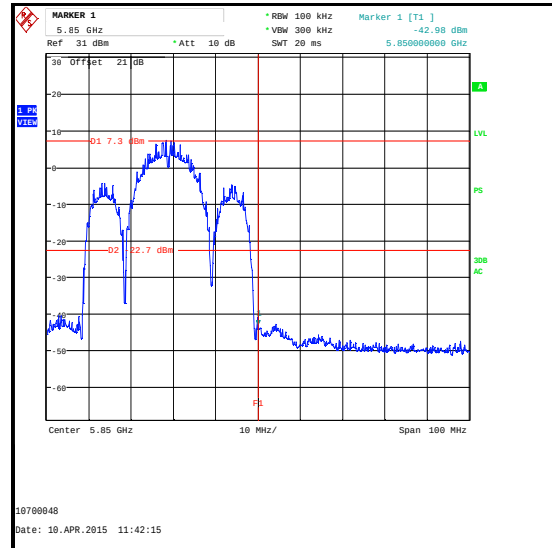
Band Edge Conducted Emissions (continued)**Results: 30 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5722.756	-24.2	-22.2	2.0	Complied
5725	-24.5	-22.2	2.3	Complied
5850	-28.0	-22.3	5.7	Complied
5851.282	-26.5	-22.3	4.2	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

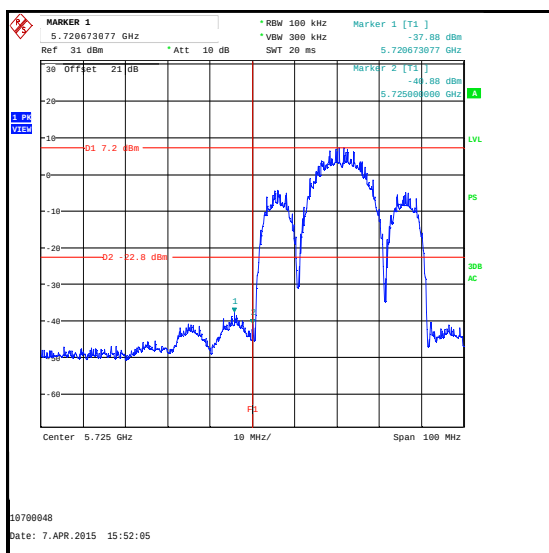
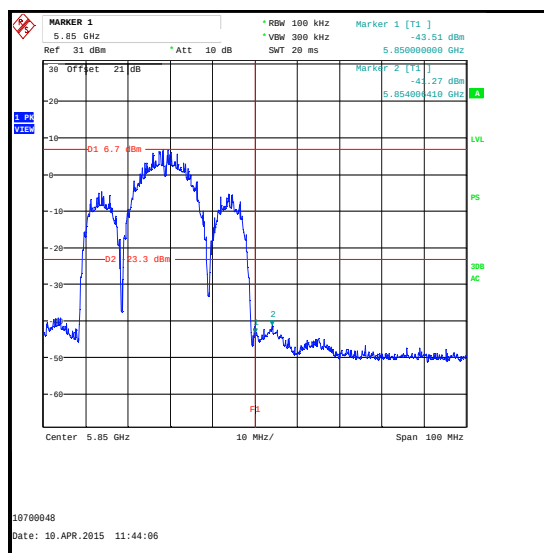
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5720.673	-38.4	-22.8	15.6	Complied
5725	-41.2	-22.8	18.4	Complied
5850	-43.0	-22.7	20.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

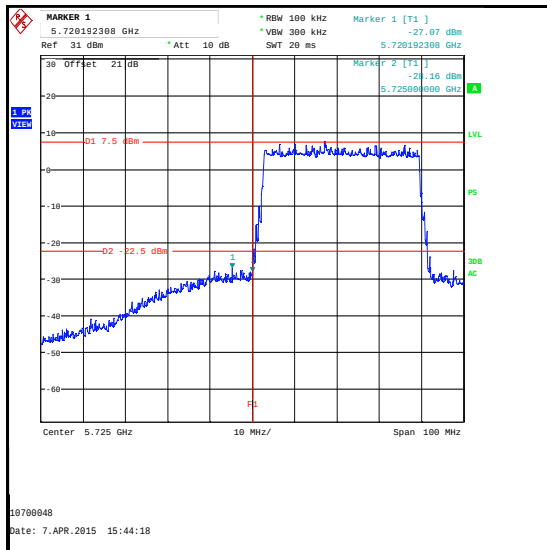
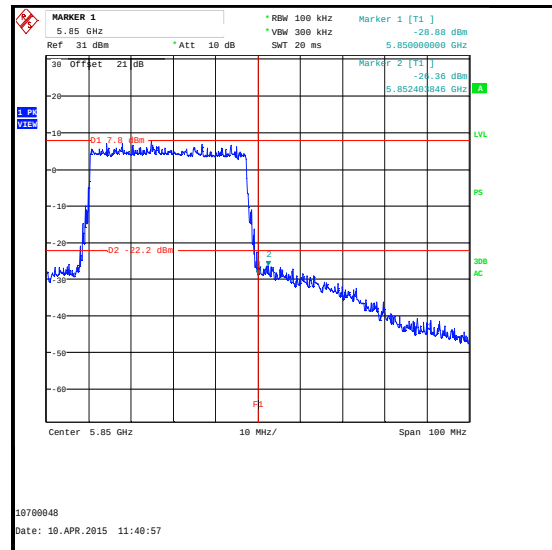
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / AQU / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5720.673	-37.9	-22.8	15.1	Complied
5725	-40.9	-22.8	18.1	Complied
5850	-43.5	-23.3	20.2	Complied
5854.006	-41.3	-23.3	18.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

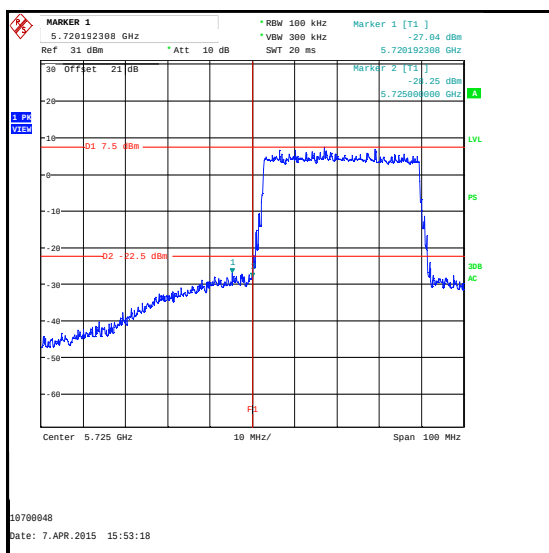
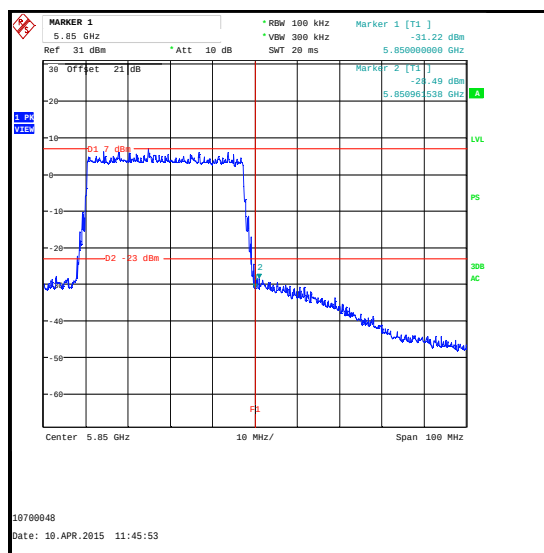
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / BPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5720.192	-27.1	-22.5	4.6	Complied
5725	-28.2	-22.5	5.7	Complied
5850	-28.9	-22.2	6.7	Complied
5852.404	-26.4	-22.2	4.2	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

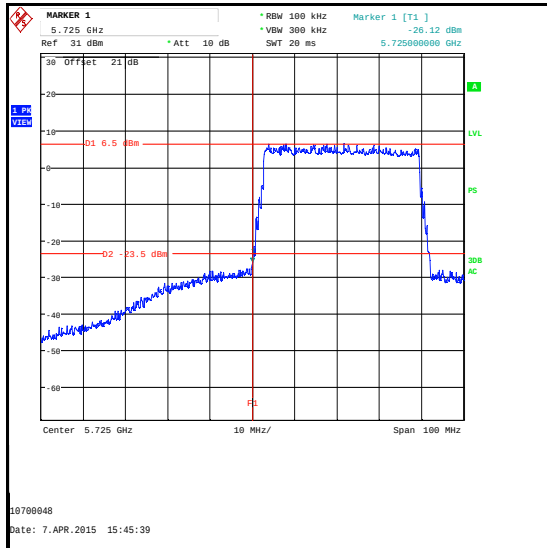
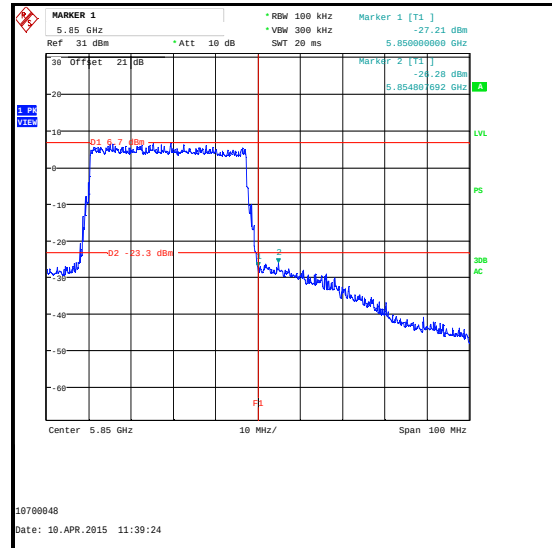
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / BPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5720.192	-27.0	-22.5	4.5	Complied
5725	-28.2	-22.5	5.7	Complied
5850	-31.2	-23.0	8.2	Complied
5850.962	-28.5	-23.0	5.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

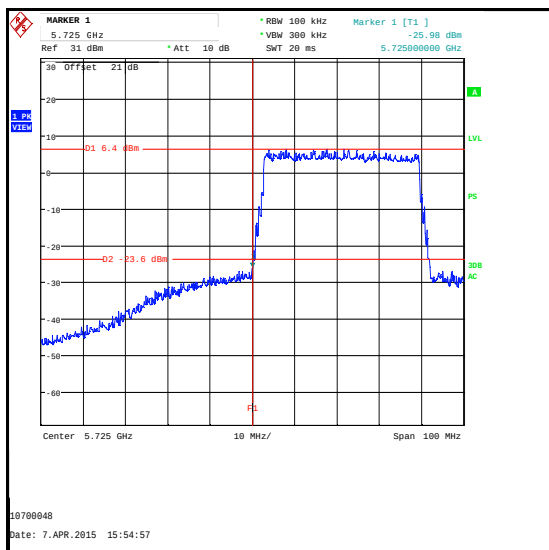
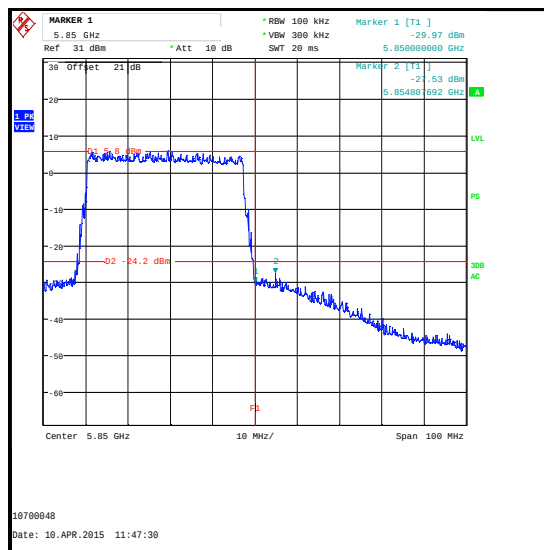
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / QPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-26.1	-23.5	2.6	Complied
5850	-27.2	-23.3	3.9	Complied
5854.808	-26.3	-23.3	3.0	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

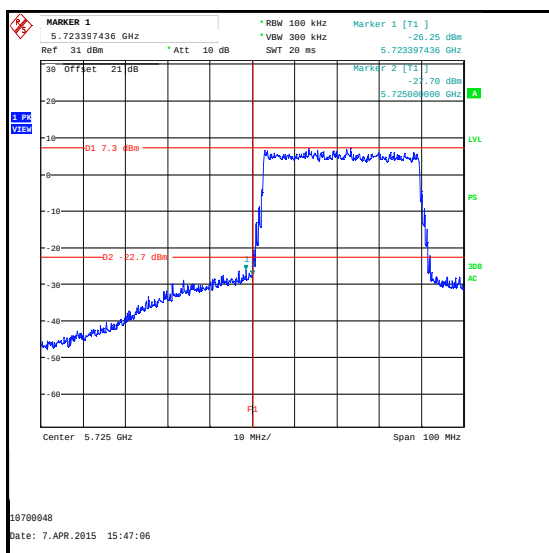
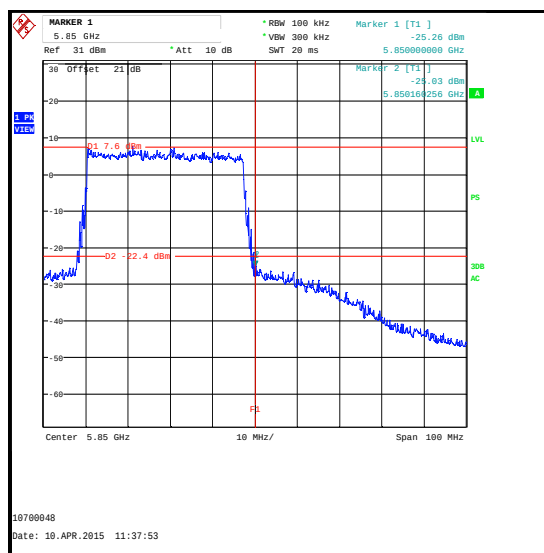
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-26.0	-23.6	2.4	Complied
5850	-30.0	-24.2	5.8	Complied
5854.808	-27.5	-24.2	3.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

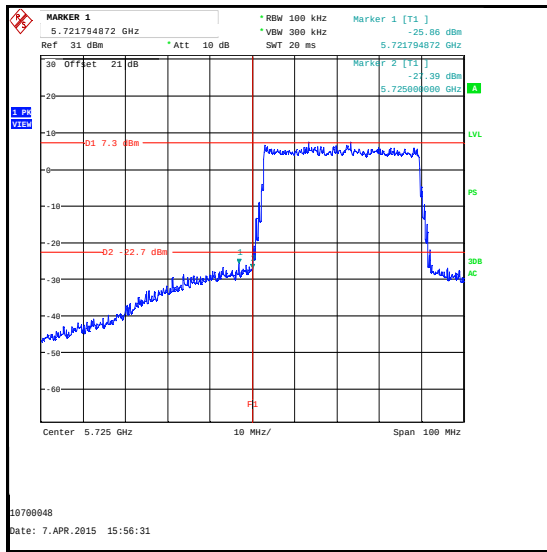
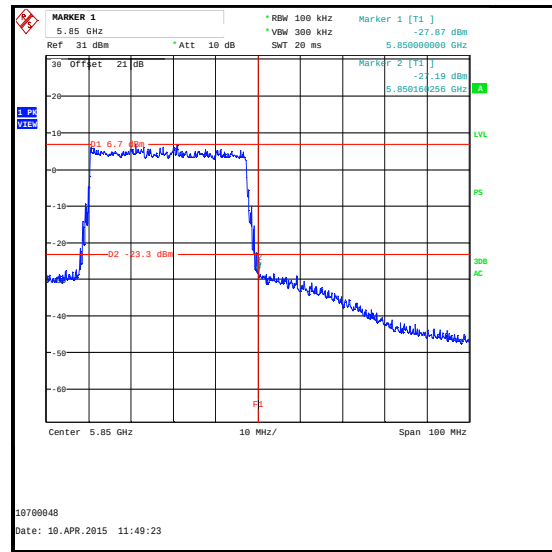
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5723.397	-26.2	-22.7	3.5	Complied
5725	-27.7	-22.7	5.0	Complied
5850	-25.3	-22.4	2.9	Complied
5850.160	-25.0	-22.4	2.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

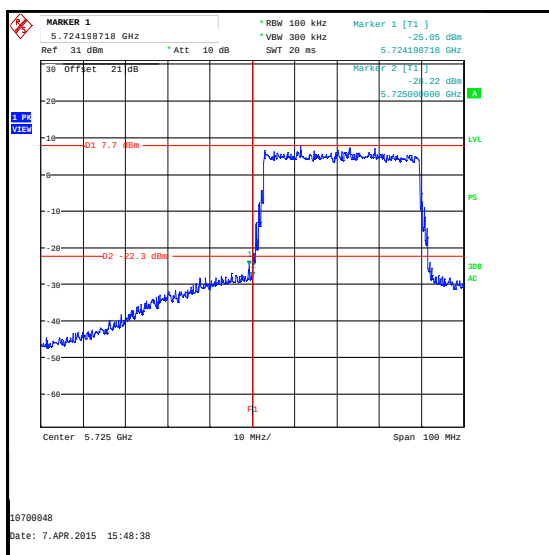
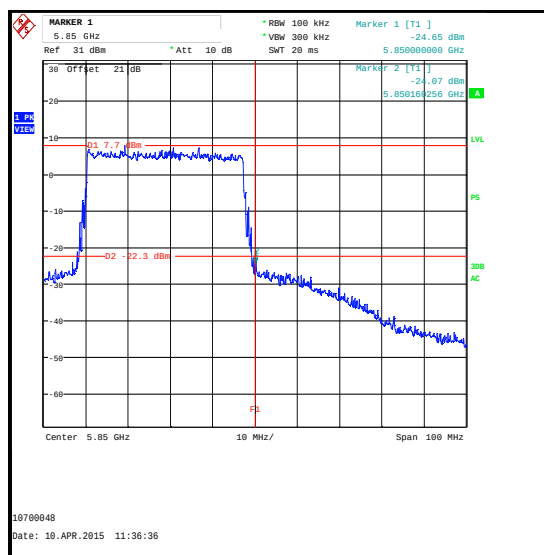
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5721.795	-25.9	-22.7	3.2	Complied
5725	-27.4	-22.7	4.7	Complied
5850	-27.9	-23.3	4.6	Complied
5850.160	-27.2	-23.3	3.9	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

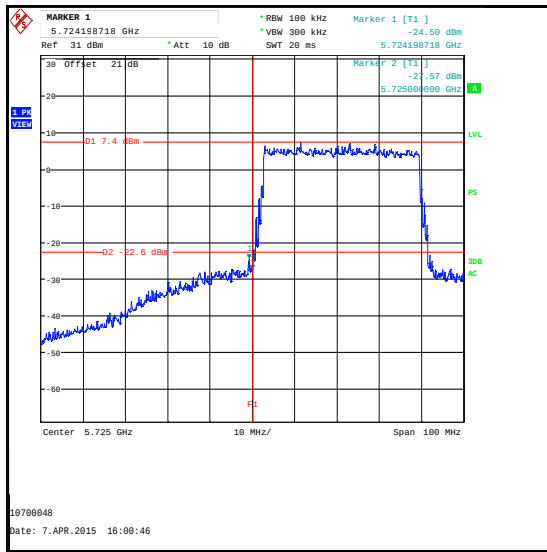
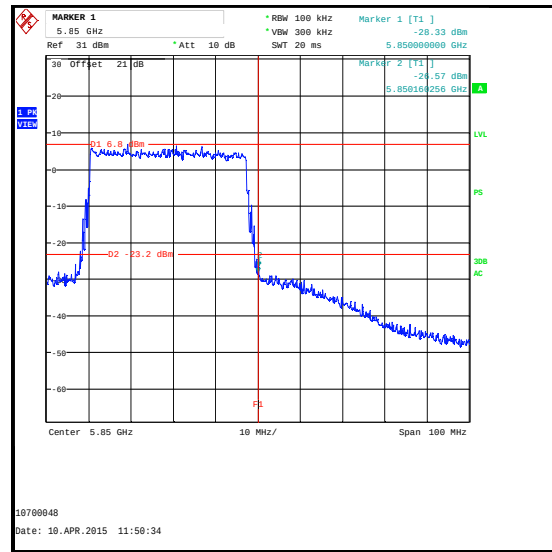
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.199	-25.0	-22.3	2.7	Complied
5725	-28.2	-22.3	5.9	Complied
5850	-24.6	-22.3	2.3	Complied
5850.160	-24.1	-22.3	1.8	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

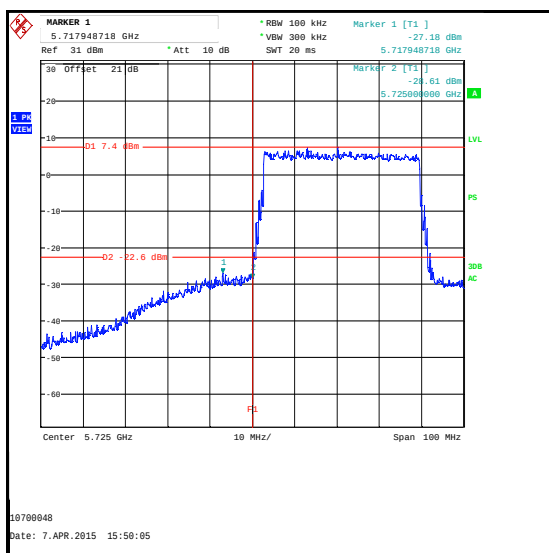
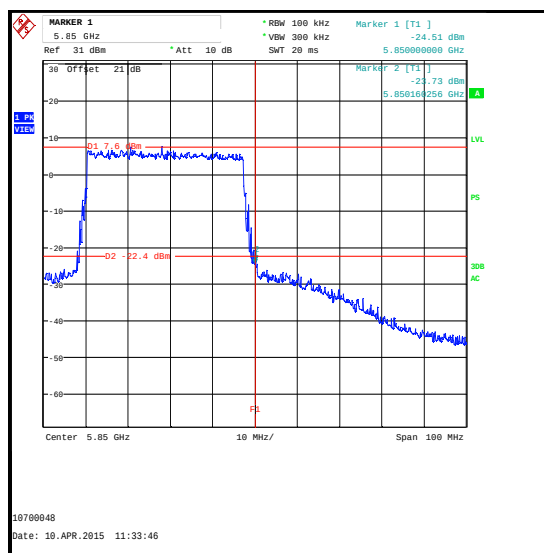
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.199	-24.5	-22.6	1.9	Complied
5725	-27.6	-22.6	5.0	Complied
5850	-28.3	-23.2	5.1	Complied
5850.160	-26.6	-23.2	3.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

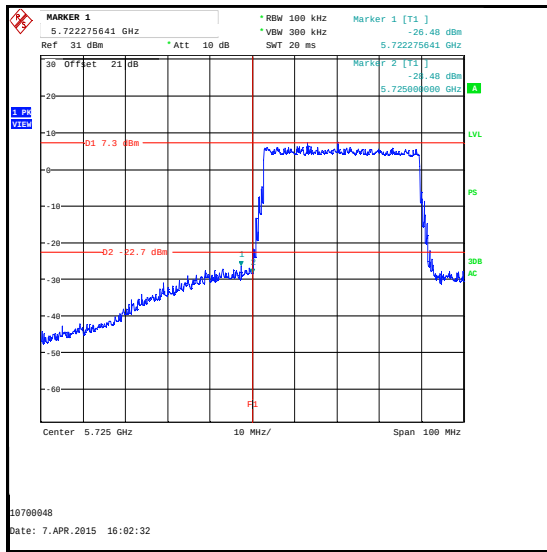
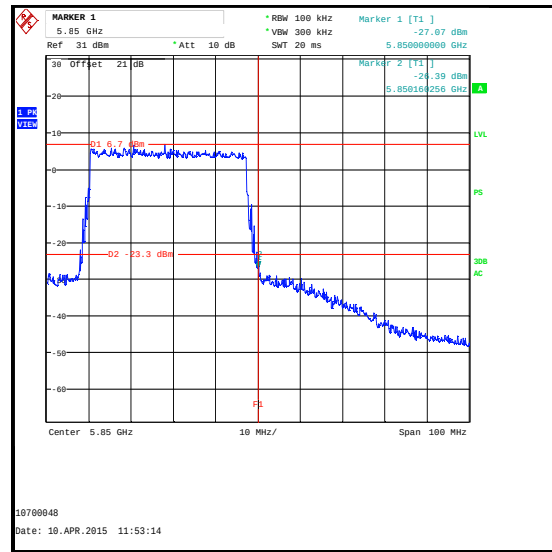
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5717.949	-27.2	-22.6	4.6	Complied
5725	-28.6	-22.6	6.0	Complied
5850	-24.5	-22.4	2.1	Complied
5850.160	-23.7	-22.4	1.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

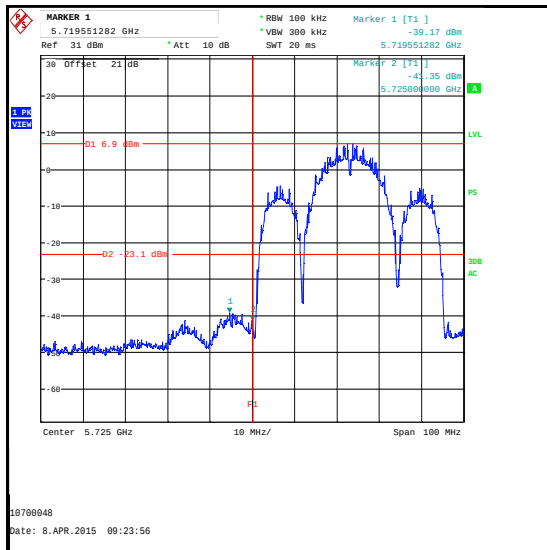
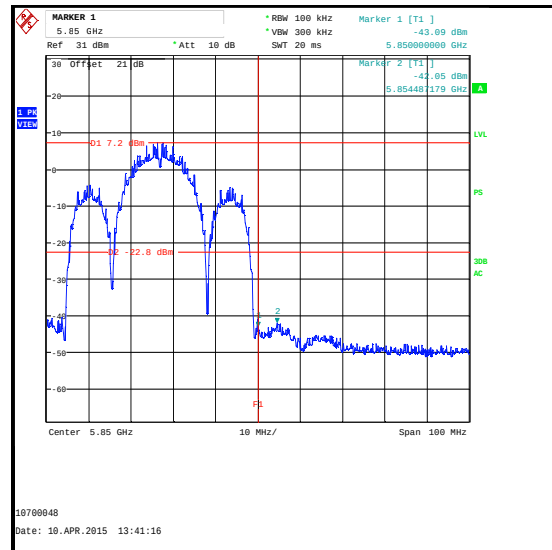
Band Edge Conducted Emissions (continued)**Results: 40 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5722.276	-26.5	-22.7	3.8	Complied
5725	-28.5	-22.7	5.8	Complied
5850	-27.1	-23.3	3.8	Complied
5850.160	-26.4	-23.3	3.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

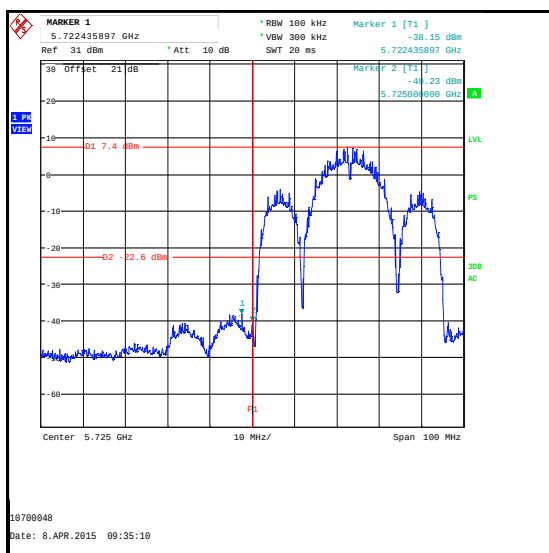
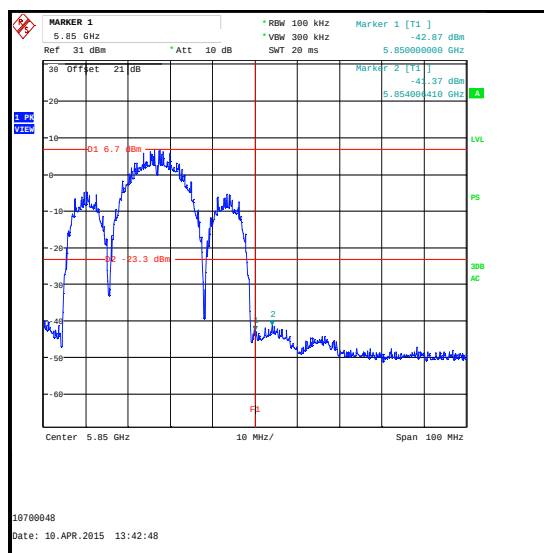
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / AQU / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5719.551	-39.2	-23.1	16.1	Complied
5725	-41.3	-23.1	18.2	Complied
5850	-43.1	-22.8	20.3	Complied
5854.487	-42.0	-22.8	19.2	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

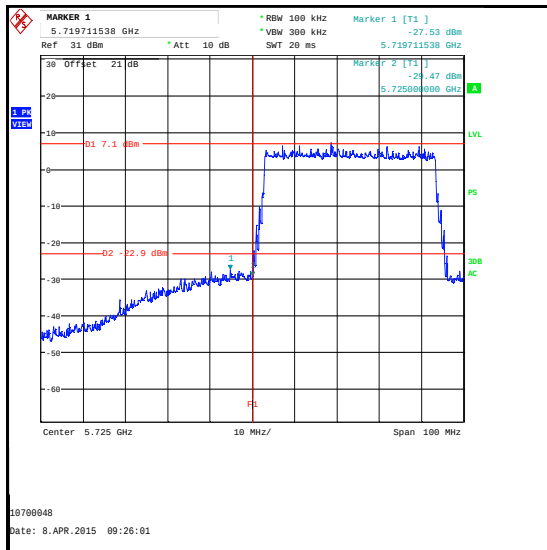
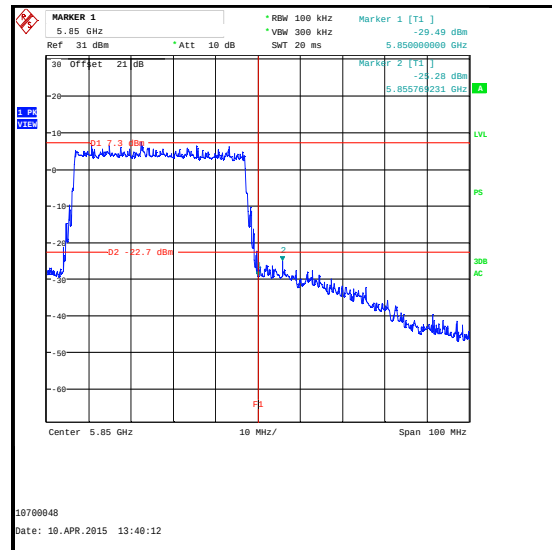
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / AQU / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5722.436	-38.1	-22.6	15.5	Complied
5725	-40.2	-22.6	17.6	Complied
5850	-42.9	-23.3	19.6	Complied
5854.006	-41.4	-23.3	18.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

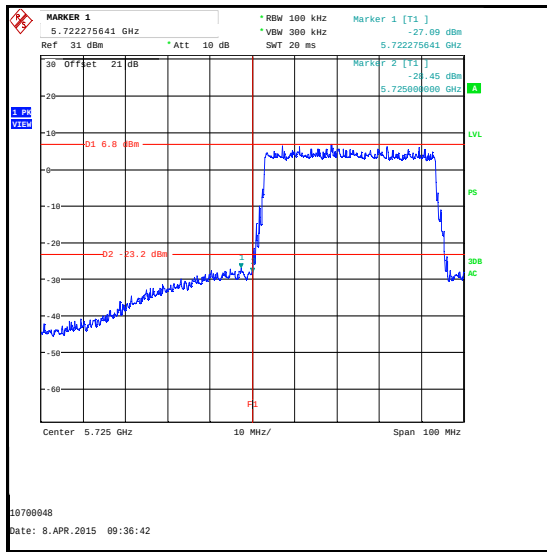
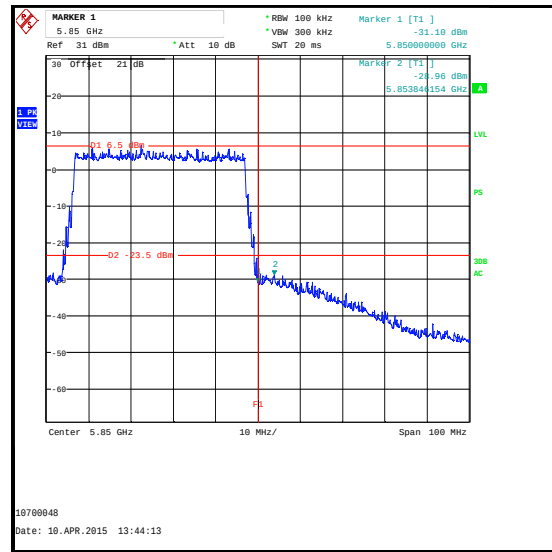
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / BPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5719.712	-27.5	-22.9	4.6	Complied
5725	-29.5	-22.9	6.6	Complied
5850	-29.5	-22.7	6.8	Complied
5855.769	-25.3	-22.7	2.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

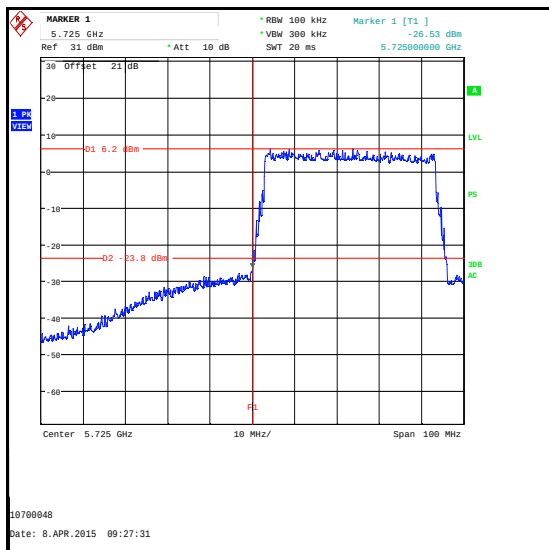
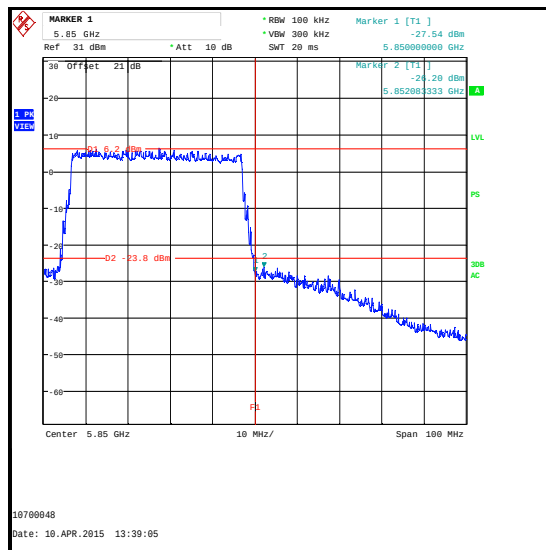
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / BPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5722.276	-27.1	-23.2	3.9	Complied
5725	-28.4	-23.2	5.2	Complied
5850	-31.1	-23.5	7.6	Complied
5853.846	-29.0	-23.5	5.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

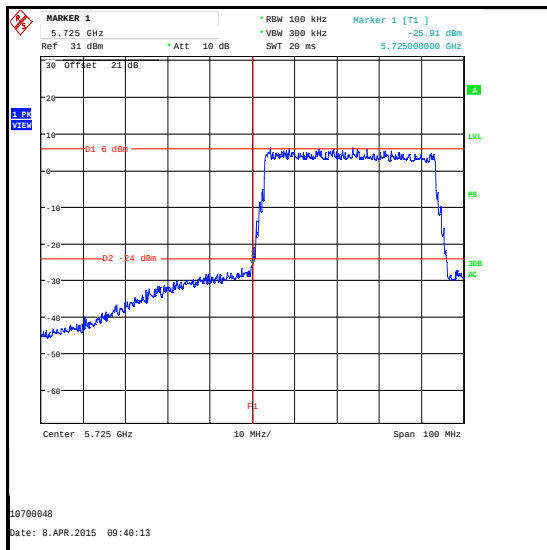
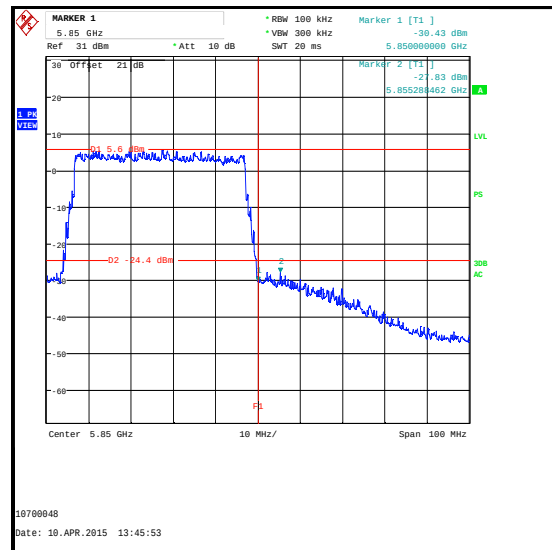
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / QPSK / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-26.5	-23.8	2.7	Complied
5850	-27.5	-23.8	3.7	Complied
5852.083	-26.2	-23.8	2.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

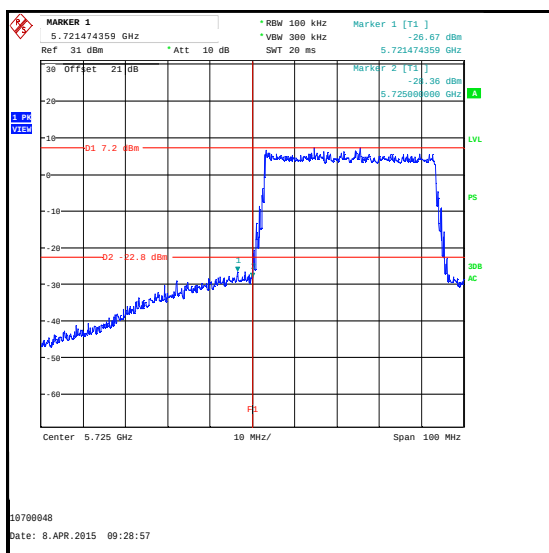
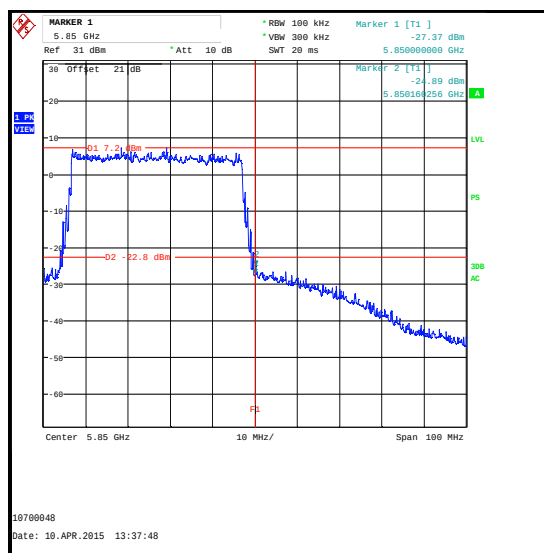
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / QPSK / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5725	-25.9	-24.0	1.9	Complied
5850	-30.4	-24.4	6.0	Complied
5855.288	-27.8	-24.4	3.4	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

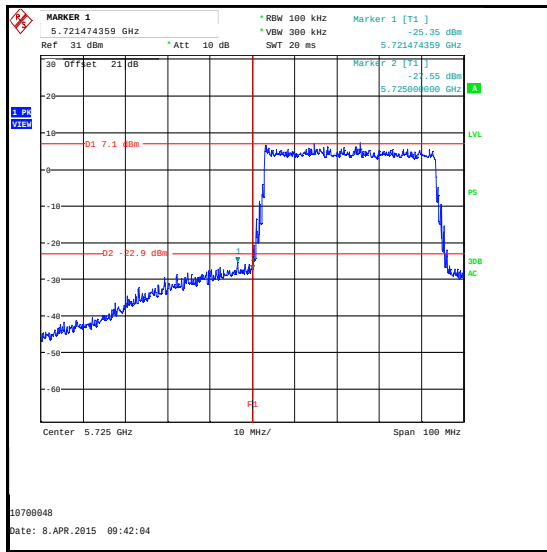
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / 16QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5721.474	-26.7	-22.8	3.9	Complied
5725	-28.4	-22.8	5.6	Complied
5850	-27.4	-22.8	4.6	Complied
5850.160	-24.9	-22.8	2.1	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

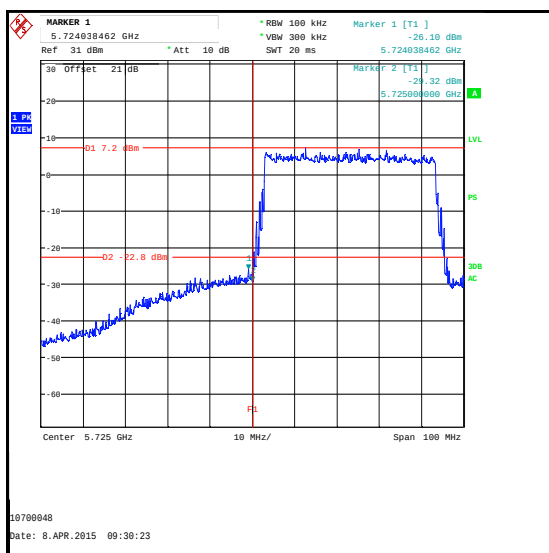
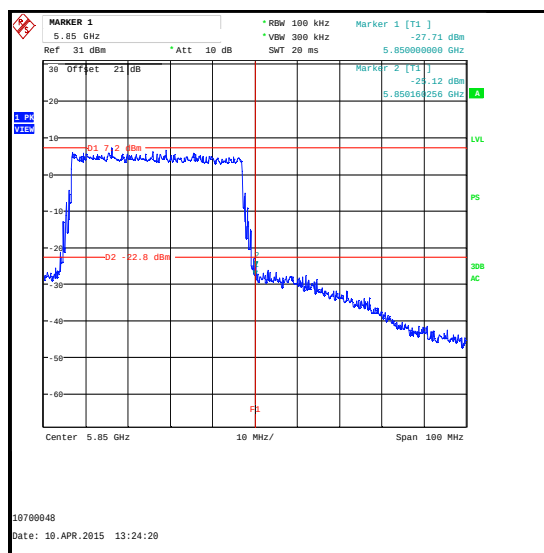
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / 16QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5721.474	-25.3	-22.9	2.4	Complied
5725	-27.5	-22.9	4.6	Complied
5850	-29.1	-23.4	5.7	Complied
5850.160	-27.6	-23.4	4.2	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

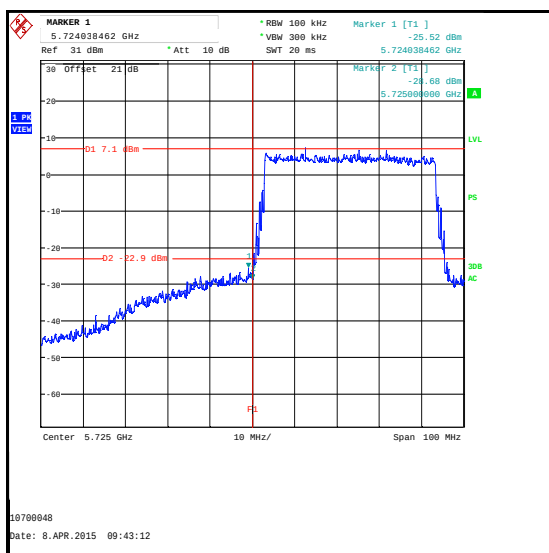
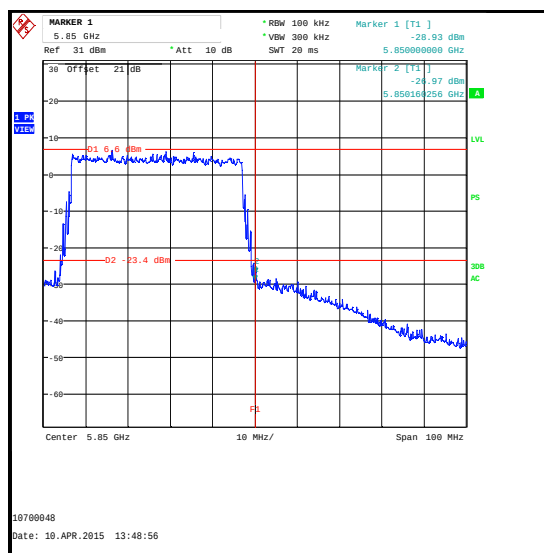
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / 64QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.038	-26.1	-22.8	3.3	Complied
5725	-29.3	-22.8	6.5	Complied
5850	-27.7	-22.8	4.9	Complied
5850.160	-25.1	-22.8	2.3	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

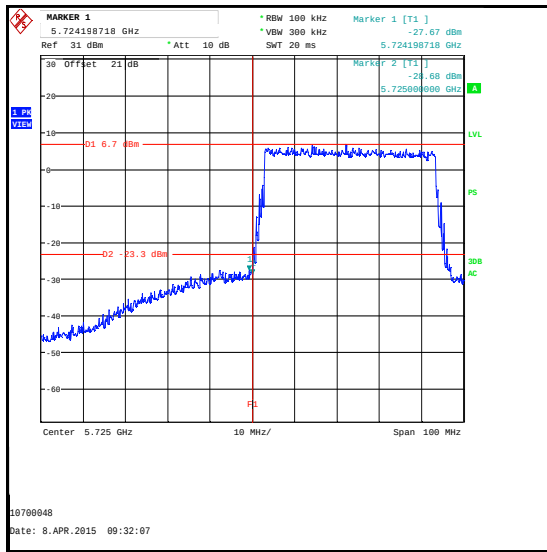
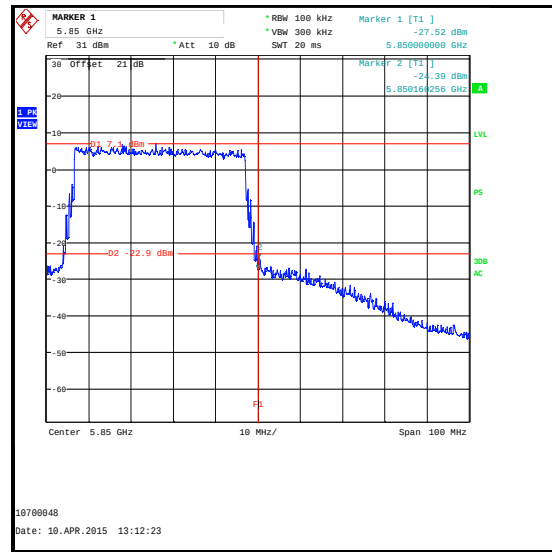
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / 64QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.038	-25.5	-22.9	2.6	Complied
5725	-28.7	-22.9	5.8	Complied
5850	-28.9	-23.4	5.5	Complied
5850.160	-27.0	-23.4	3.6	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

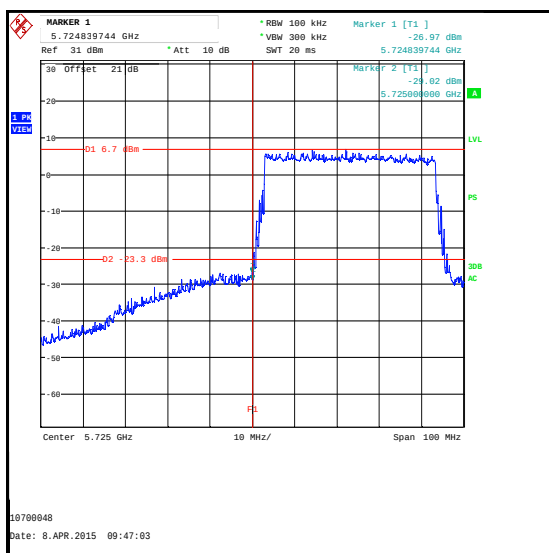
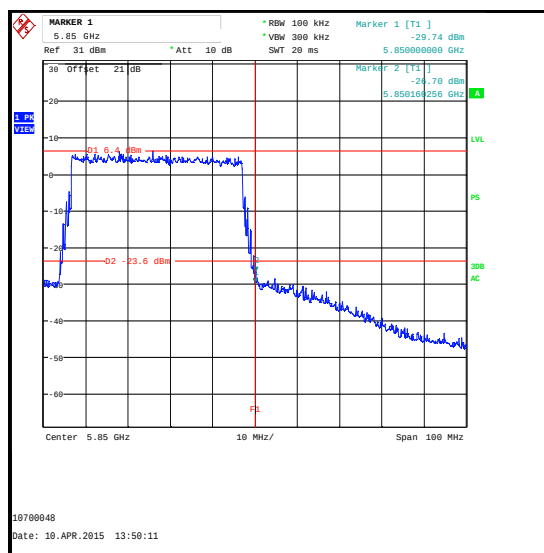
Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / 256QAM / H Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.199	-27.7	-23.3	4.4	Complied
5725	-28.7	-23.3	5.4	Complied
5850	-27.5	-22.9	4.6	Complied
5850.160	-24.4	-22.9	1.5	Complied

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

Band Edge Conducted Emissions (continued)**Results: 45 MHz Channel / 256QAM / V Port**

Frequency (MHz)	Peak Level (dBm)	-30 dBc Limit (dBm)	Margin (dB)	Result
5724.840	-27.0	-23.3	3.7	Complied
5725	-29.0	-23.3	5.7	Complied
5850	-29.7	-23.6	6.1	Complied
5850.160	-26.7	-23.6	3.1	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)
A2527	Attenuator	AtlanTechRF	AN18W5-20	832828#2	Calibrated before use	-
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	09 May 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	24 Apr 2015	12
M1784	Thermohygrometer	JM Handelspunkt	30.5015.13	N/A	24 Apr 2015	12

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

Test Engineer:	Georgios Vrezas	Test Dates:	13 April 2015 & 17 April 2015
Test Sample Serial Number:	F52320580038		

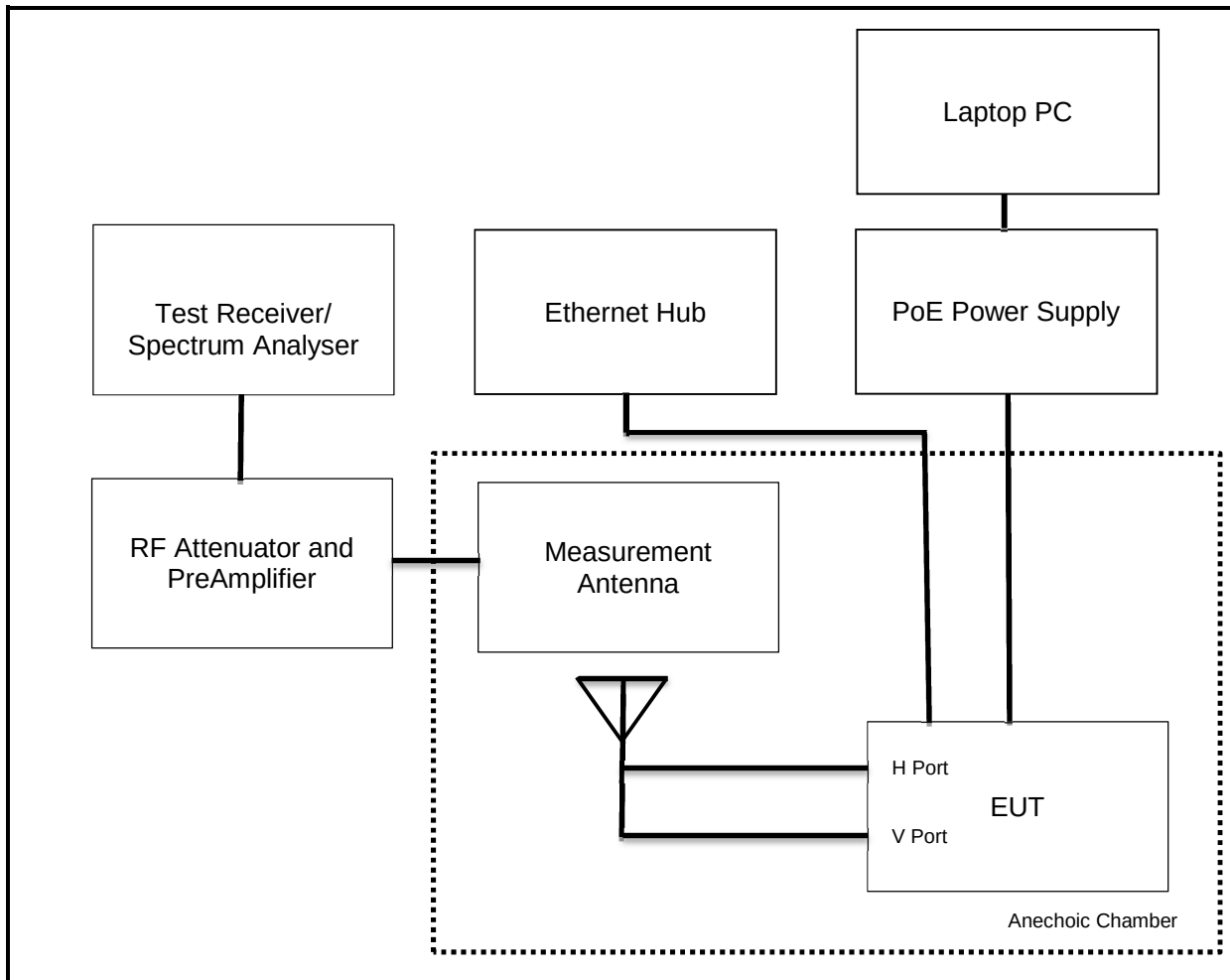
FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Section 11 and 12 / ANSI C63.10-2009 Sections 6.3 and 6.5 referencing ANSI C63.4-2009
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	24 to 28

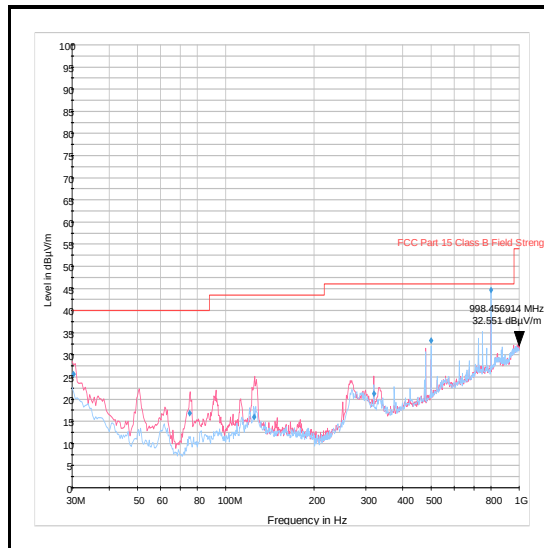
Note(s):

1. For the plate and sectorised antennas, all emissions shown on the pre-scan plots 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.
2. For the parabolic and omnidirectional antennas, all other emissions shown on the pre-scan plots were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss
4. 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.
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. 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:**

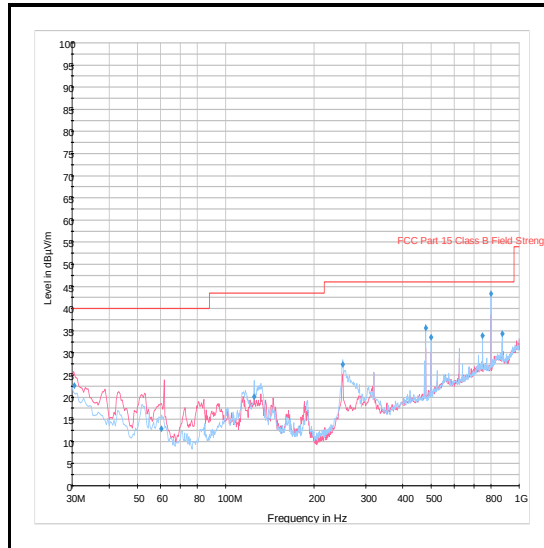
Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Plate Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
998.457	Horizontal	32.6	54.0	21.4	Complied



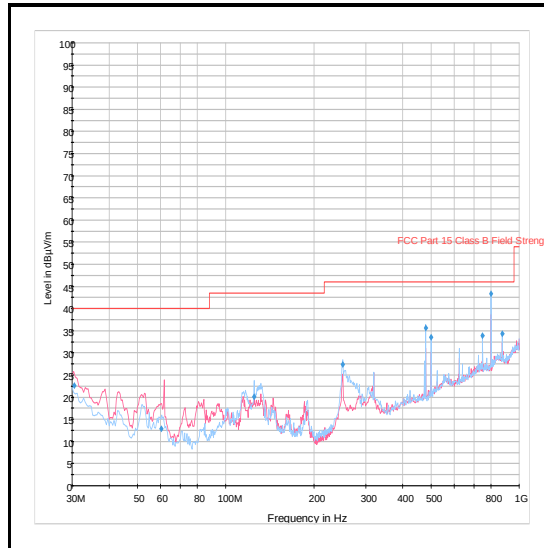
Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / 4' Parabolic Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
249.999	Horizontal	27.5	46.0	18.5	Complied



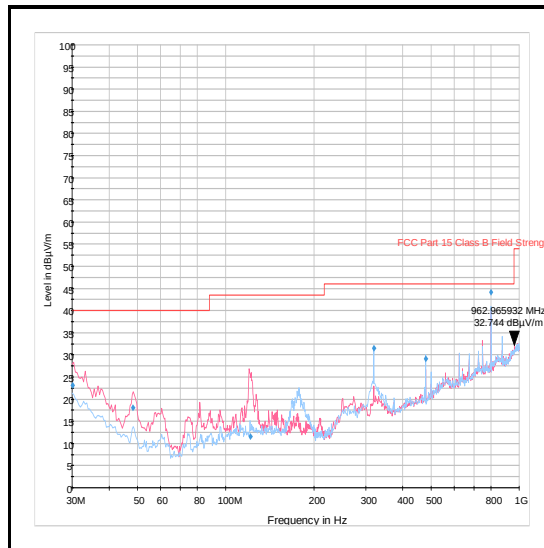
Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / 6' Parabolic Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
249.999	Horizontal	30.3	46.0	15.7	Complied



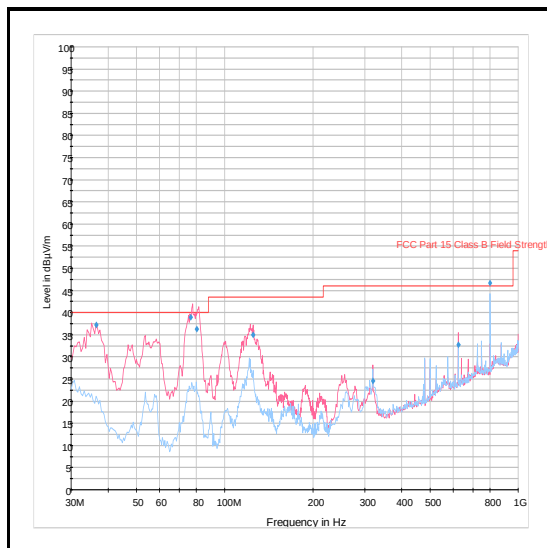
Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Sectorised Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
962.966	Vertical	32.7	54.0	21.3	Complied



Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Omnidirectional Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
124.986	Vertical	35.0	43.5	8.5	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	Not stated	07 Jan 2016	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	19 Mar 2016	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	19 Mar 2016	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
L1097	Low Pass Filter	AtlanTecRF	AS6573	13022102350	Calibrated before use	-

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

Test Engineer:	Georgios Vrezas	Test Dates:	11 April 2015 & 12 April 2015
Test Sample Serial Number:	F52320580038		

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 (%):	31 to 36

Note(s):

1. For the plate and parabolic antennas, the final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.
2. For the sectorised and omnidirectional antennas, no spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the tables below.
3. Radiated spurious emissions testing was performed with the EUT transmitting at maximum power on a 5 MHz channel with BPSK modulation. This configuration produced the highest emission levels and was therefore deemed to be worst case. The EUT was transmitting at 100% duty cycle.
4. The reference levels for emissions in non-restricted bands were established by following KDB 558074 D01 Section 11.2 procedure.
5. 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.
6. 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.
7. *-30 dBc limit applies in non-restricted bands as the conducted output power and spectral density tests were performed using an average detector.
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 / BPSK / Peak / Plate Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5124.295	Horizontal	52.2	74.0	21.8	Complied
11460.179	Horizontal	48.0	74.0	26.0	Complied

Results: Bottom Channel / BPSK / Average / Plate Antenna

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5124.295	Horizontal	41.8	54.0	12.2	Complied
11458.353	Horizontal	35.1	54.0	18.9	Complied

Results: Middle Channel / BPSK / Peak / Plate Antenna

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5124.295	Horizontal	52.2	74.0	21.8	Complied
11573.013	Horizontal	56.8	74.0	17.2	Complied

Results: Middle Channel / BPSK / Average / Plate Antenna

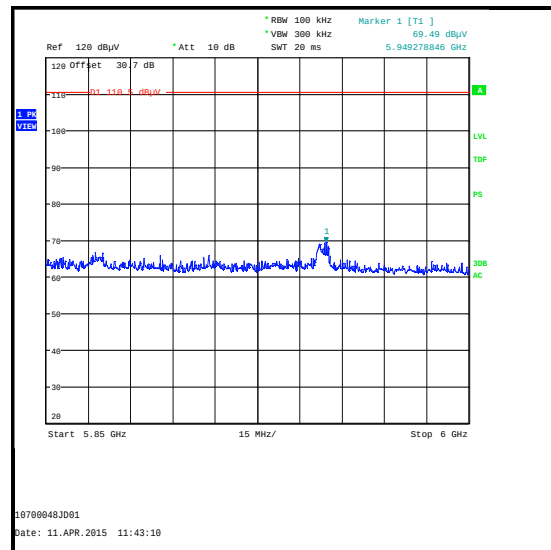
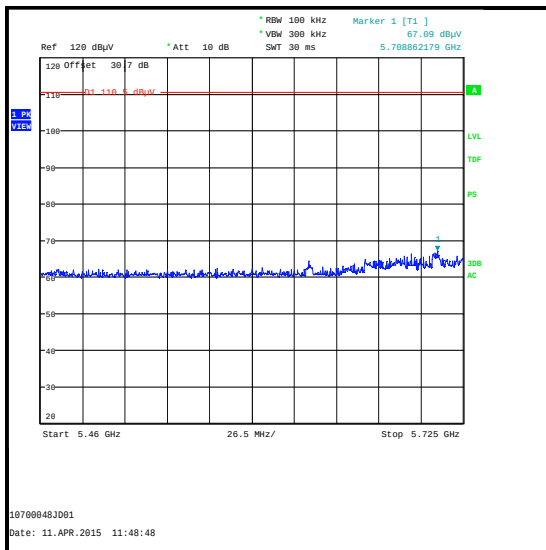
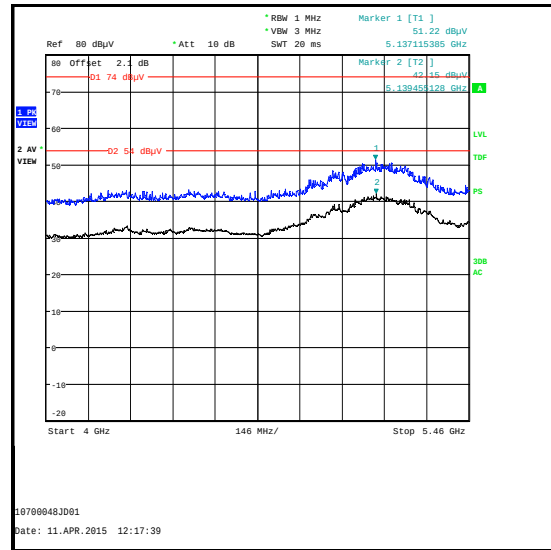
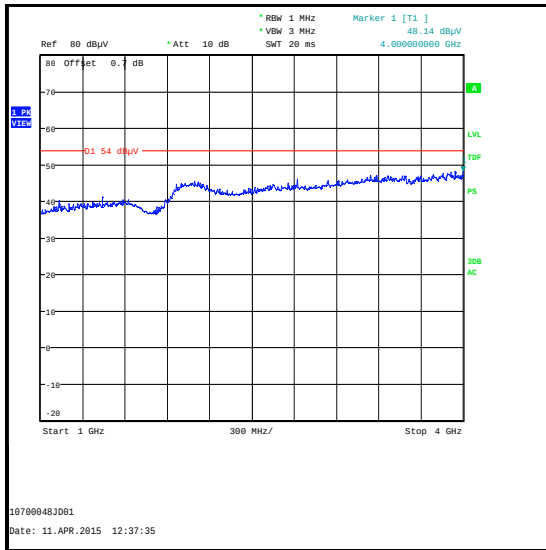
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5124.295	Horizontal	41.8	54.0	12.2	Complied
11575.801	Horizontal	44.8	54.0	9.2	Complied

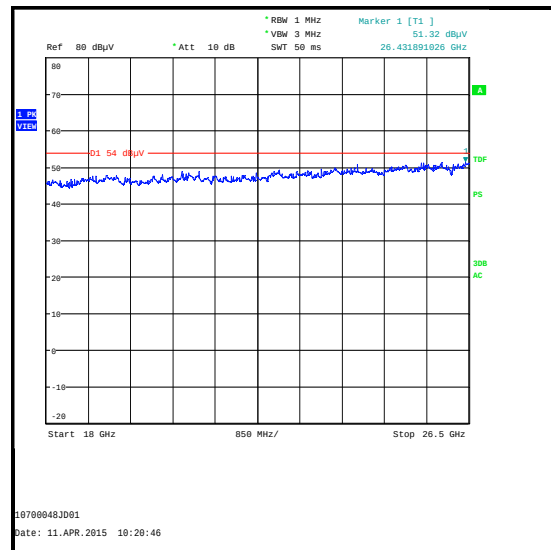
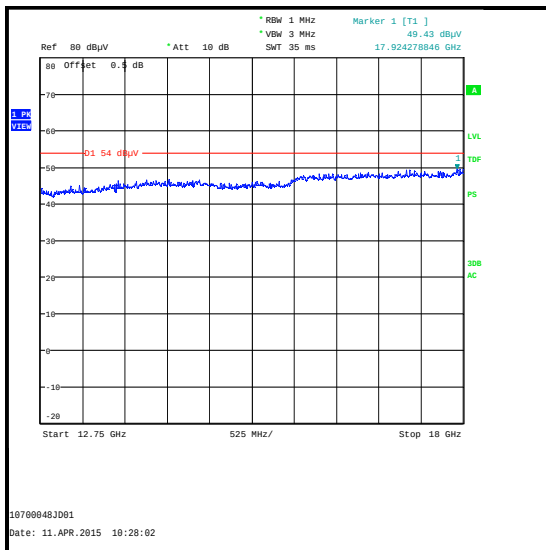
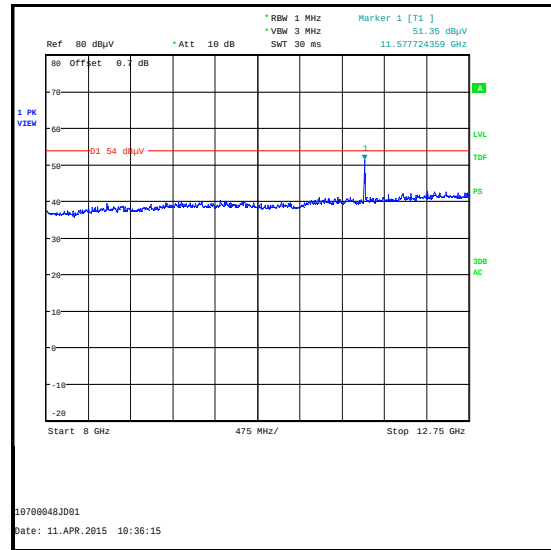
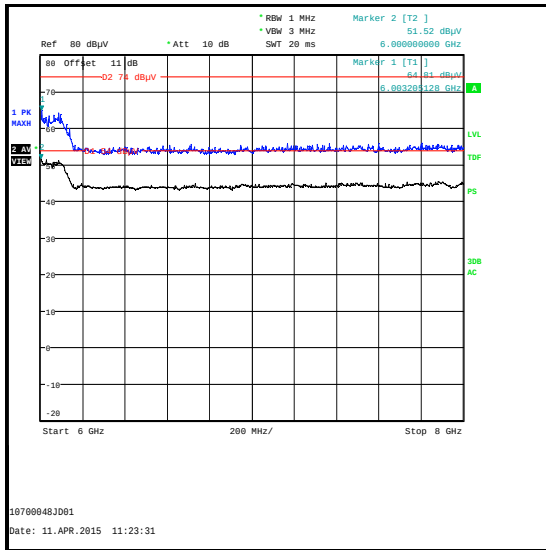
Results: Top Channel / BPSK / Peak / Plate Antenna

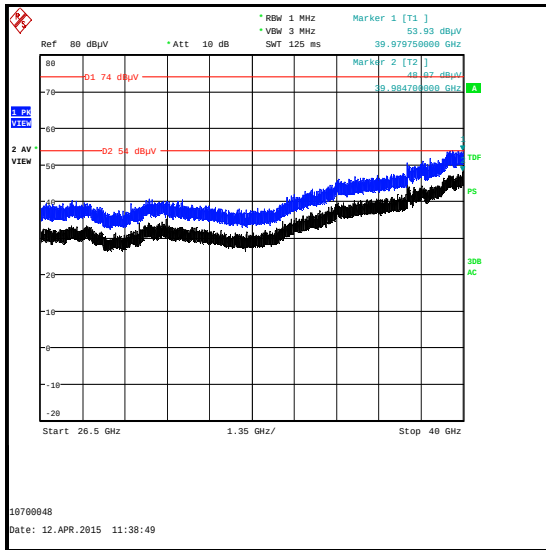
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5124.295	Horizontal	52.2	74.0	21.8	Complied
11691.968	Horizontal	53.6	74.0	20.4	Complied

Results: Top Channel / BPSK / Average / Plate Antenna

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5124.295	Horizontal	41.8	54.0	12.2	Complied
11691.904	Horizontal	37.1	54.0	16.9	Complied

Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Plate Antenna**

Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Plate Antenna**

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

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4991.250	Vertical	59.5	74.0	14.5	Complied
11458.952	Vertical	44.6	74.0	29.4	Complied

Results: Bottom Channel / BPSK / Average / 4' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4950.064	Vertical	48.8	54.0	5.2	Complied
11458.071	Vertical	31.2	54.0	22.8	Complied

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

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4972.788	Vertical	60.3	74.0	13.7	Complied
11572.837	Vertical	48.8	74.0	25.2	Complied

Results: Middle Channel / BPSK / Average / 4' Parabolic Antenna

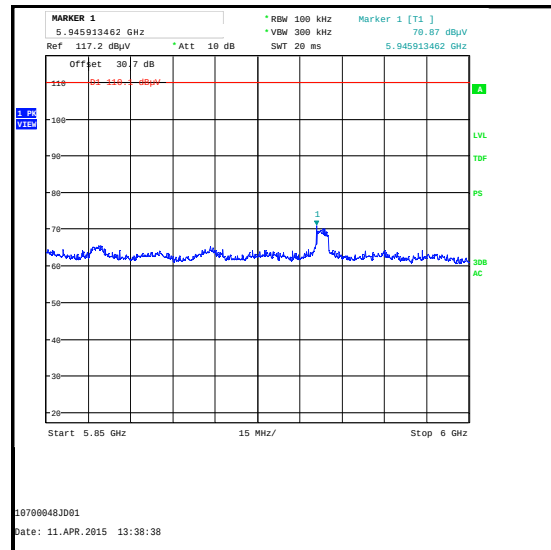
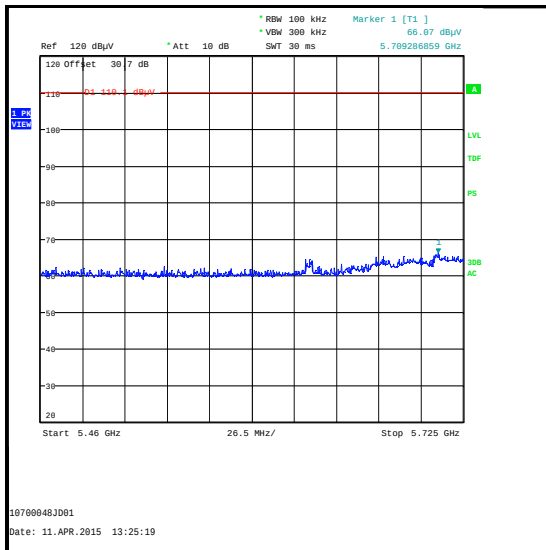
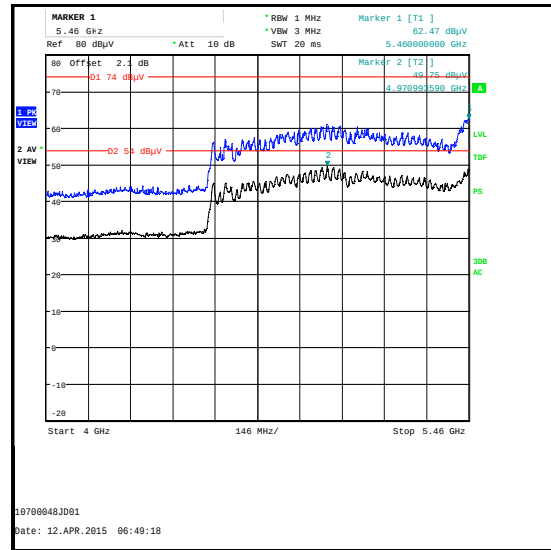
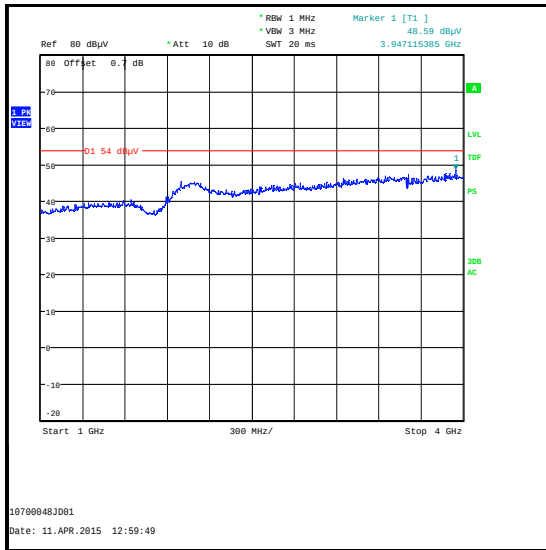
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4992.019	Vertical	48.6	54.0	5.4	Complied
11574.840	Vertical	35.3	54.0	18.7	Complied

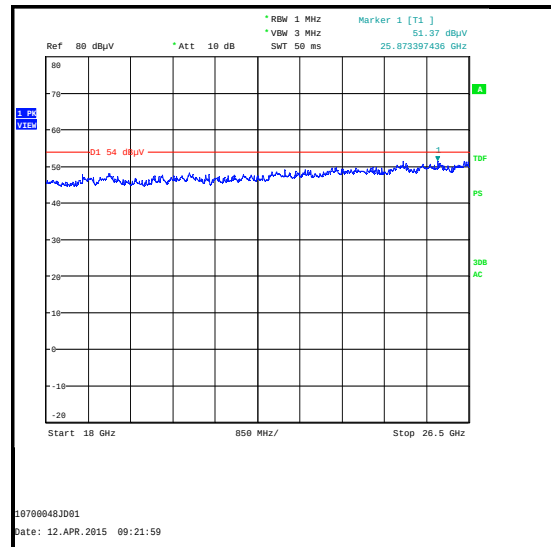
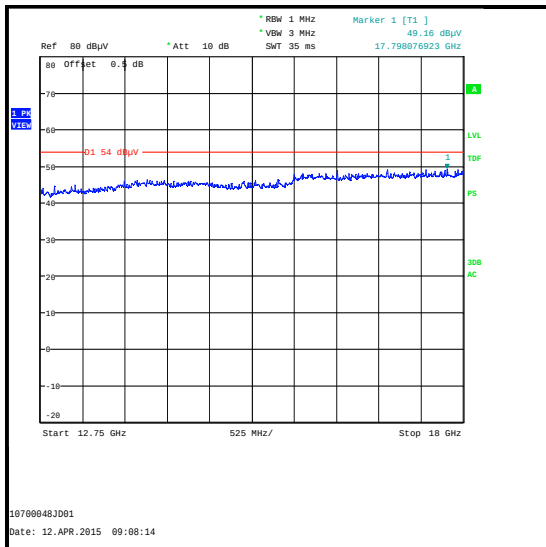
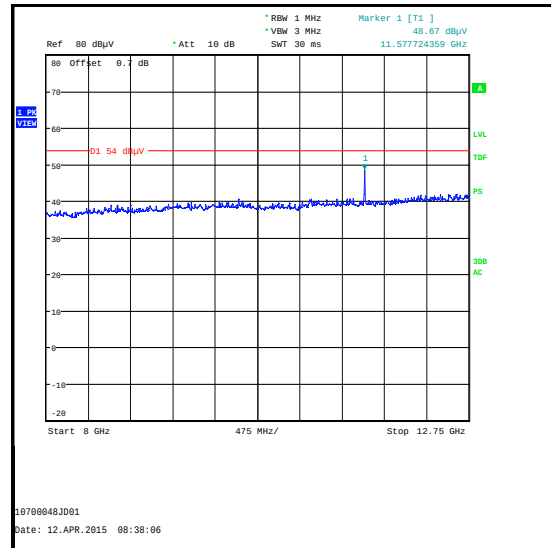
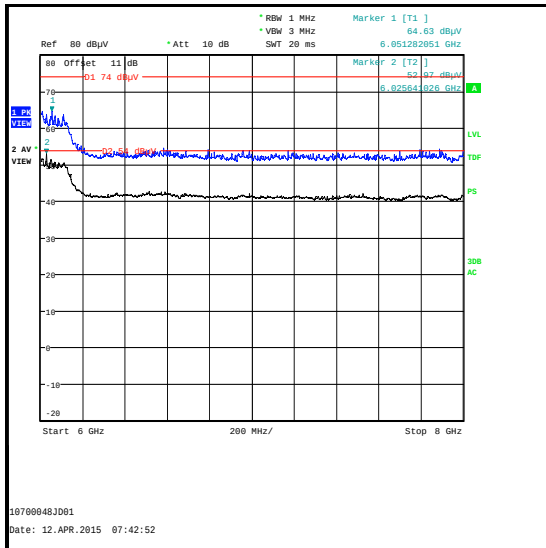
Results: Top Channel / BPSK / Peak / 4' Parabolic Antenna

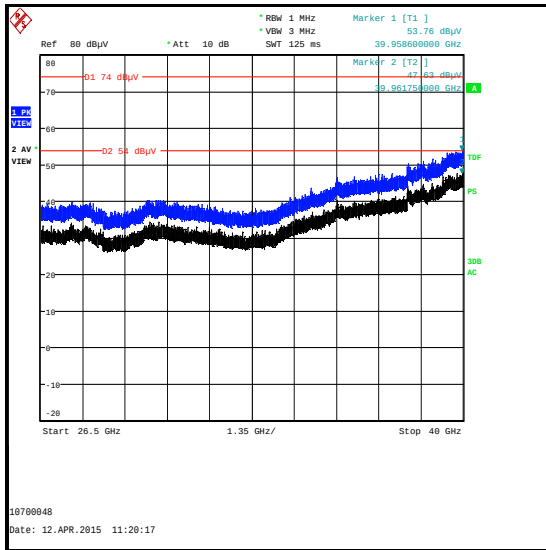
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4990.609	Vertical	58.8	74.0	15.2	Complied
11693.282	Vertical	45.0	74.0	29.0	Complied

Results: Top Channel / BPSK / Average / 4' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4992.051	Vertical	48.2	54.0	5.8	Complied
11692.881	Vertical	30.7	54.0	23.3	Complied

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

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

Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / 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: Bottom Channel / BPSK / Peak / 6' Parabolic Antenna**

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4991.250	Vertical	62.3	74.0	11.7	Complied
11458.952	Vertical	47.4	74.0	26.6	Complied

Results: Bottom Channel / BPSK / Average / 6' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4950.064	Vertical	51.6	54.0	2.4	Complied
11458.071	Vertical	34.0	54.0	20.0	Complied

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

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4972.788	Vertical	63.1	74.0	10.9	Complied
11572.837	Vertical	51.6	74.0	22.4	Complied

Results: Middle Channel / BPSK / Average / 6' Parabolic Antenna

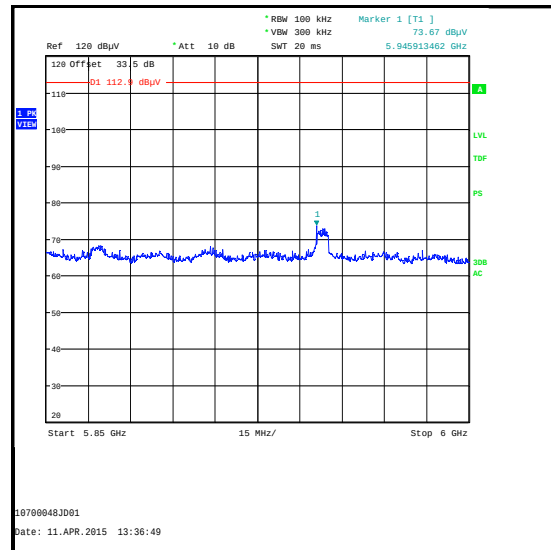
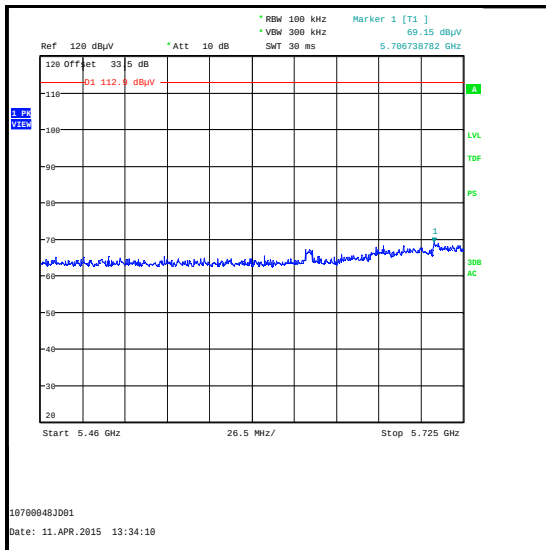
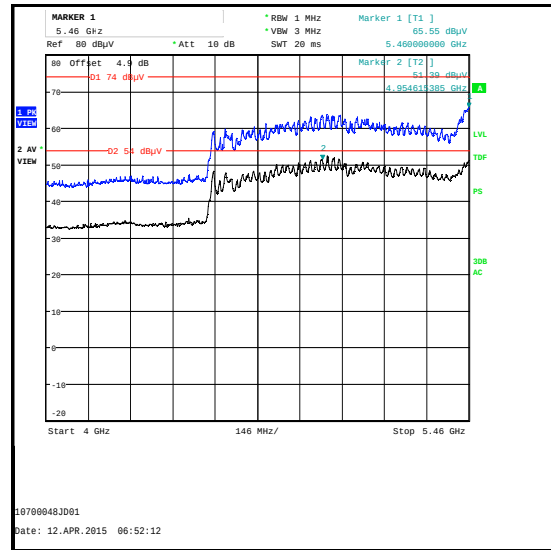
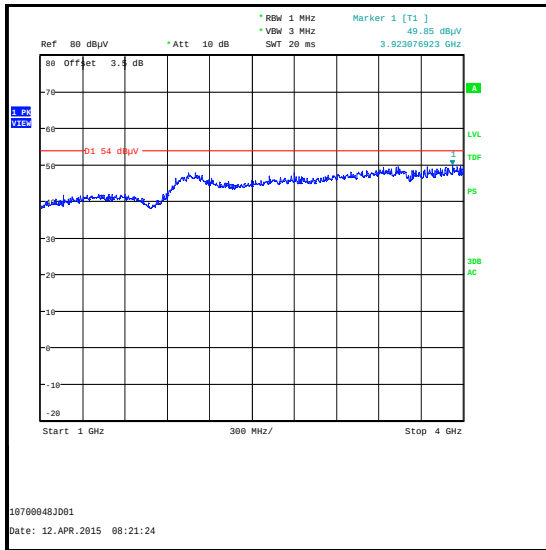
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4992.019	Vertical	51.4	54.0	2.6	Complied
11574.840	Vertical	38.1	54.0	15.9	Complied

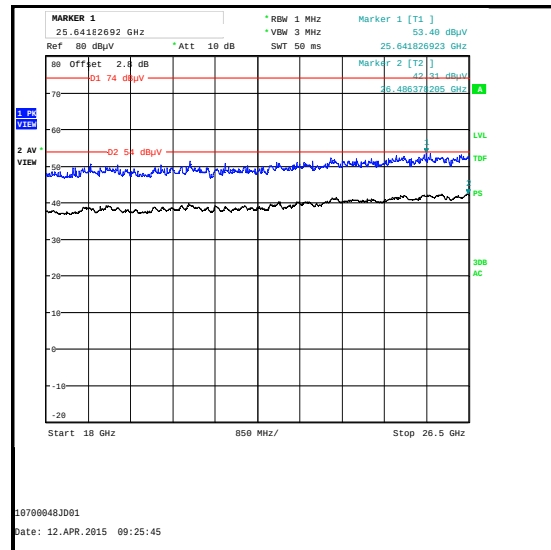
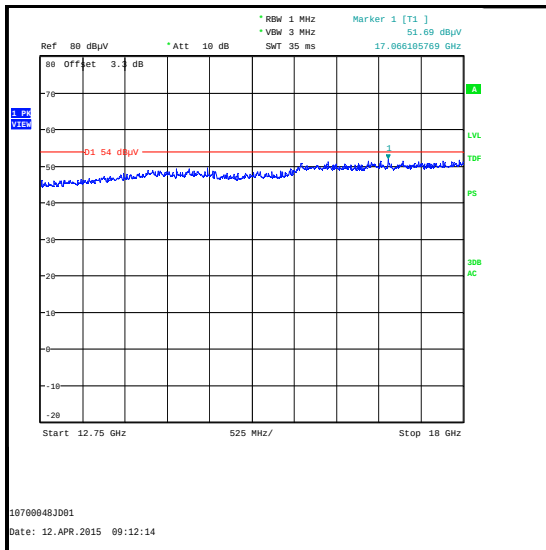
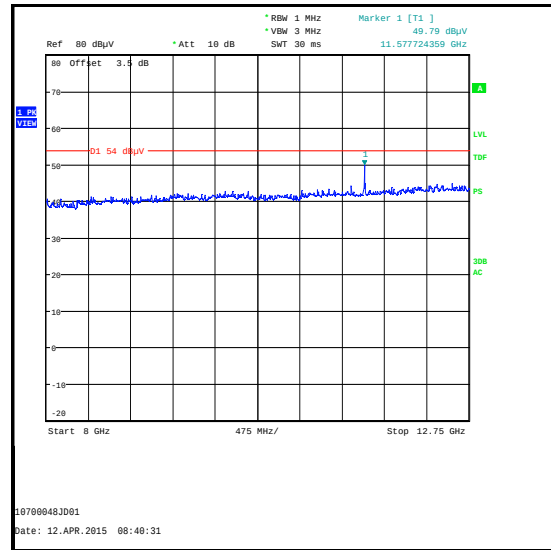
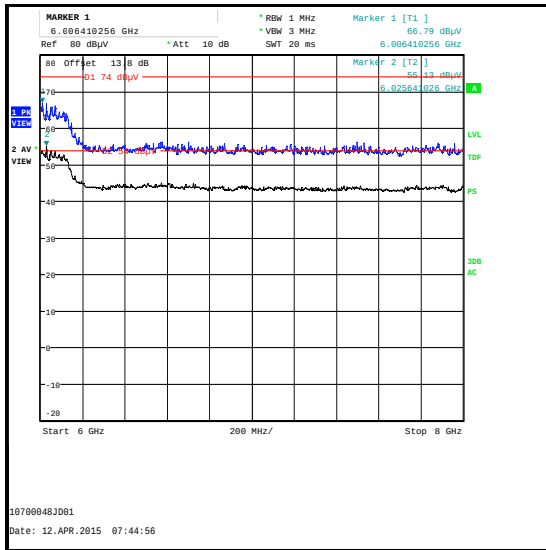
Results: Top Channel / BPSK / Peak / 6' Parabolic Antenna

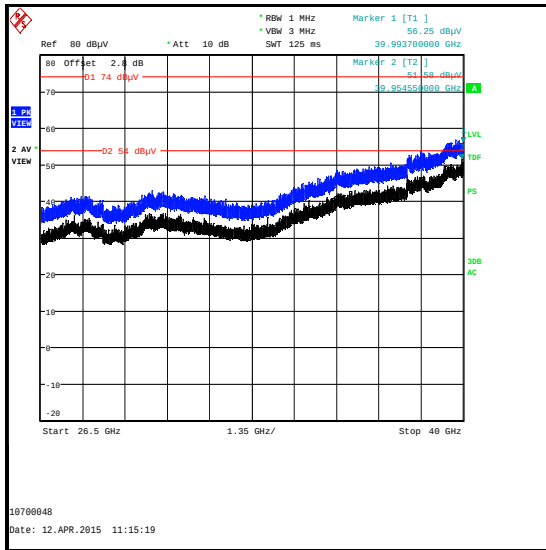
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4990.609	Vertical	61.6	74.0	12.4	Complied
11693.282	Vertical	47.8	74.0	26.2	Complied

Results: Top Channel / BPSK / Average / 6' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4992.051	Vertical	51.0	54.0	3.0	Complied
11692.881	Vertical	33.5	54.0	20.5	Complied

Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / 6' Parabolic Antenna**

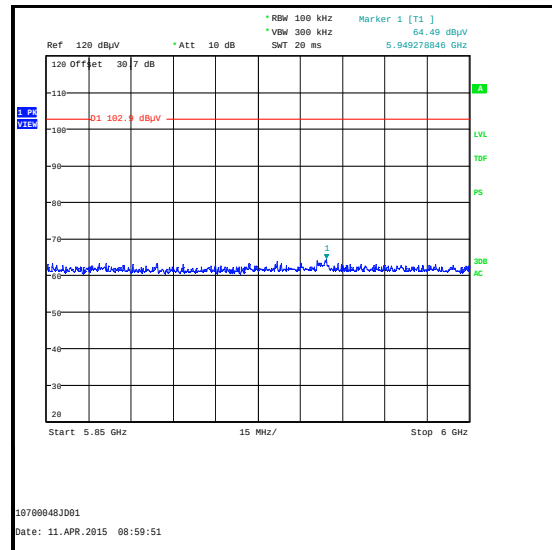
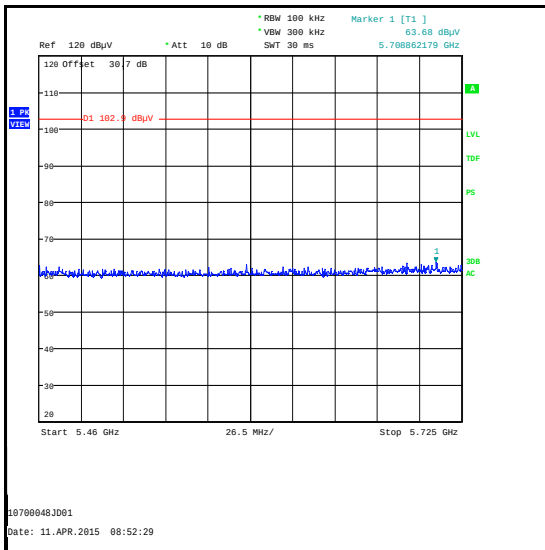
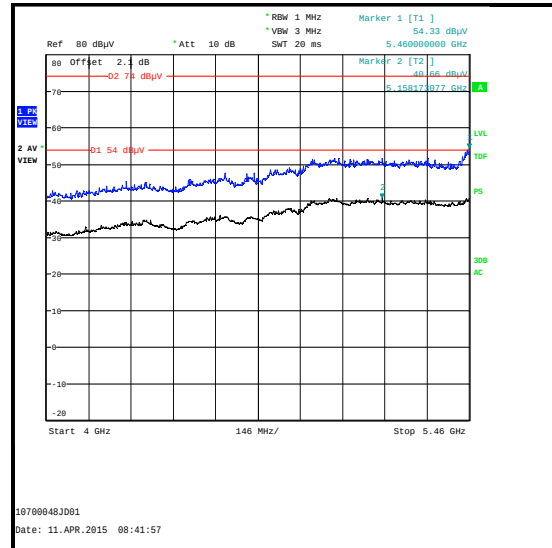
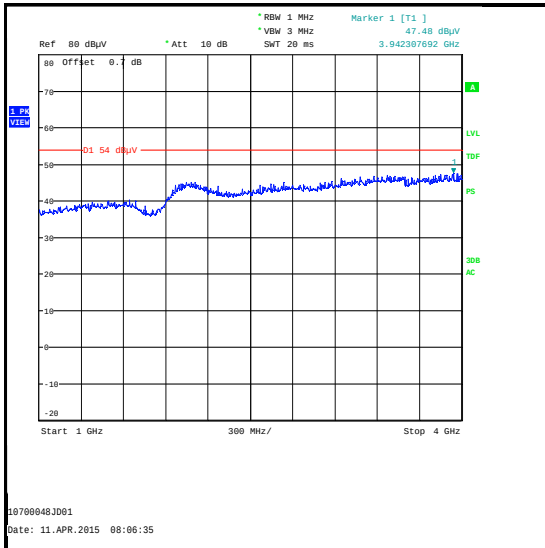
Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / 6' Parabolic Antenna**

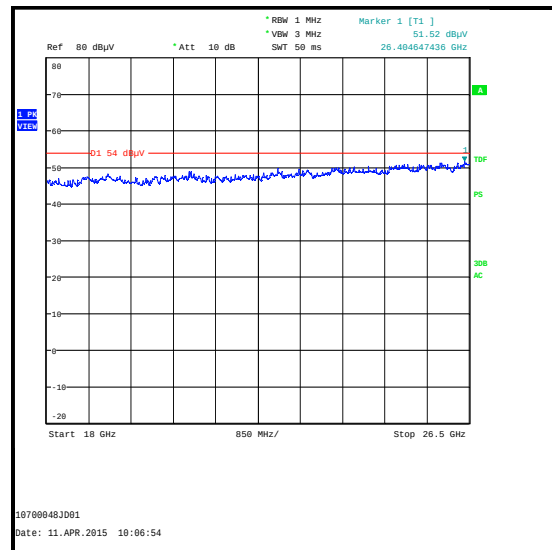
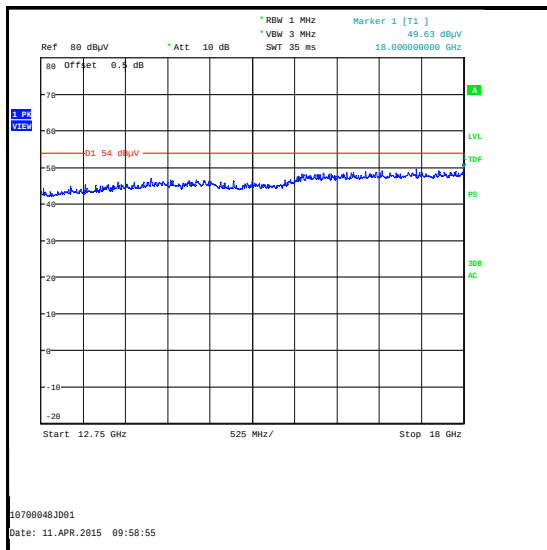
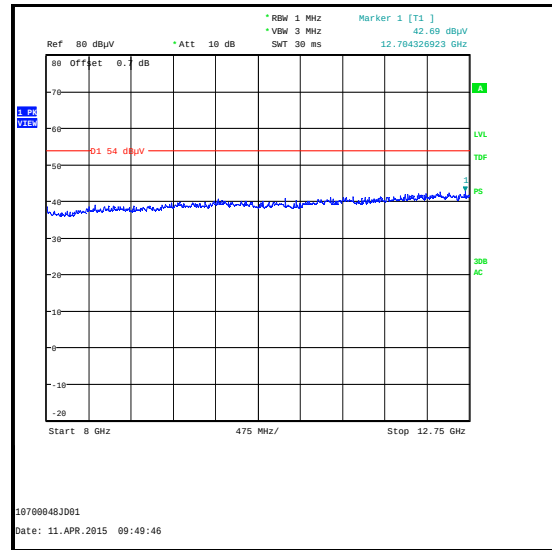
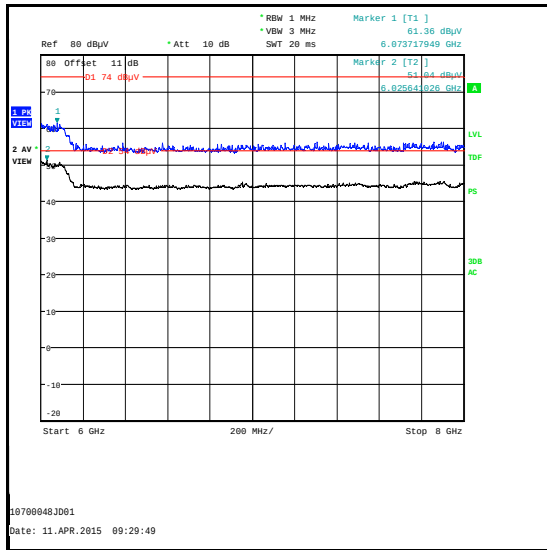
Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / 6' Parabolic Antenna**

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

Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Sectorised Antenna**

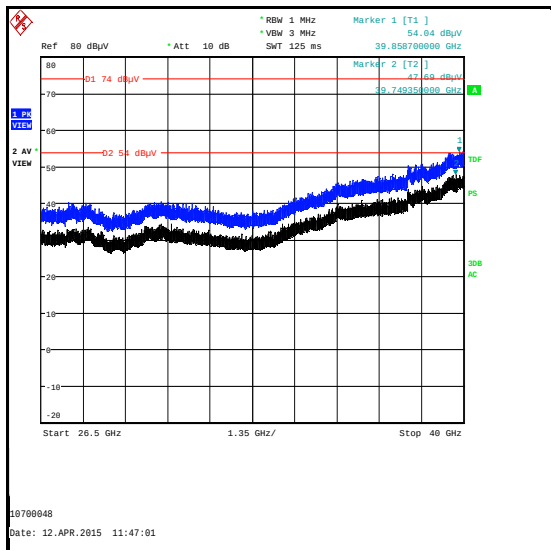
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5949.279	Vertical	64.5	102.9	38.4	Complied



Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Sectorised Antenna**

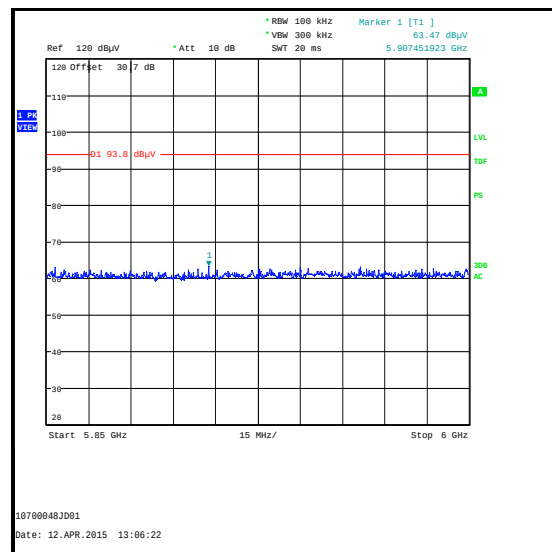
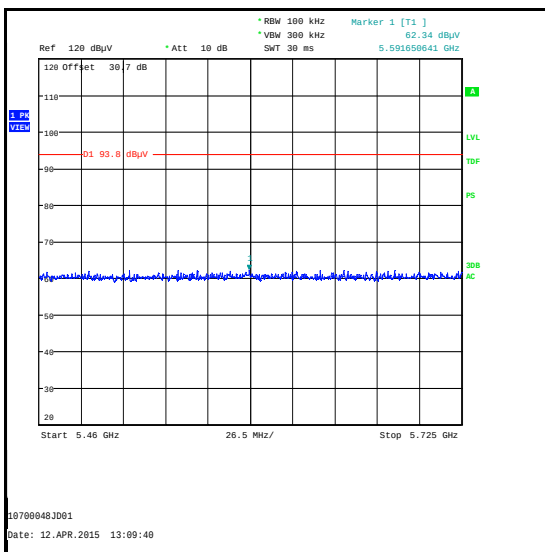
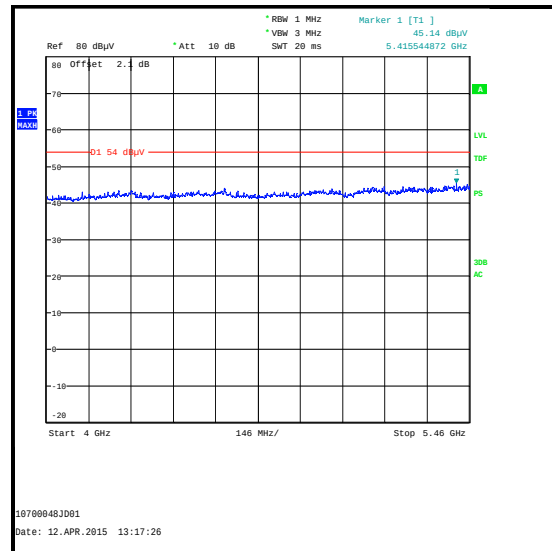
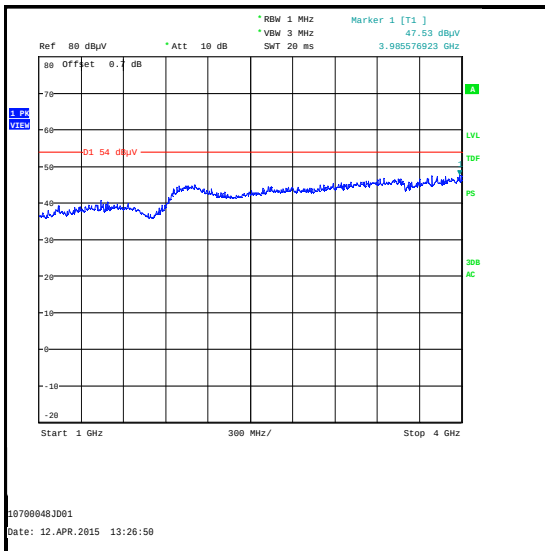
Transmitter Radiated Emissions (continued)

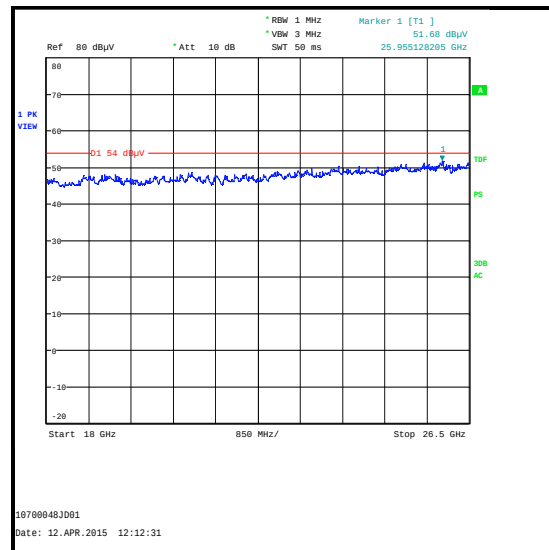
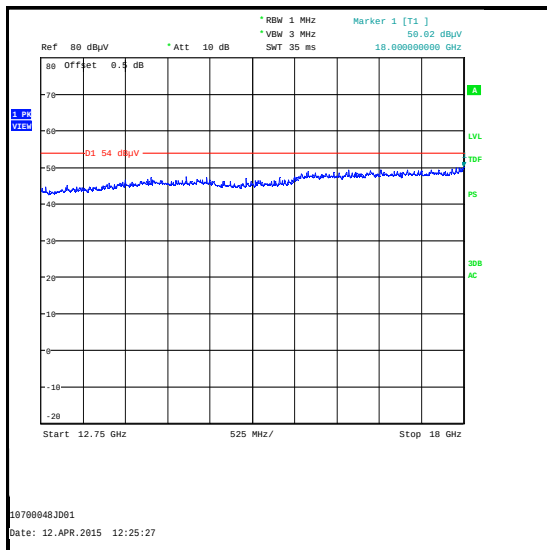
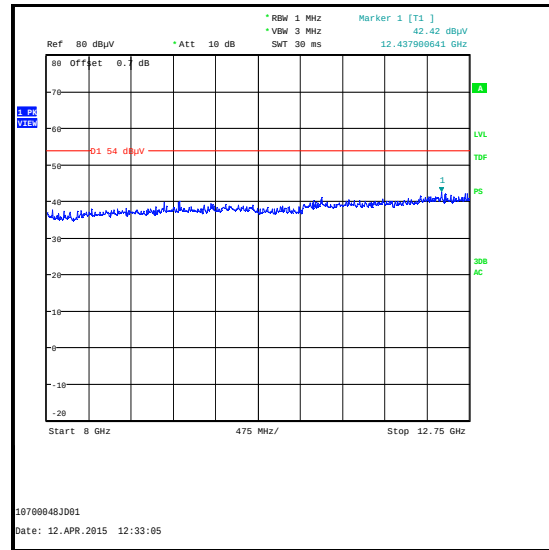
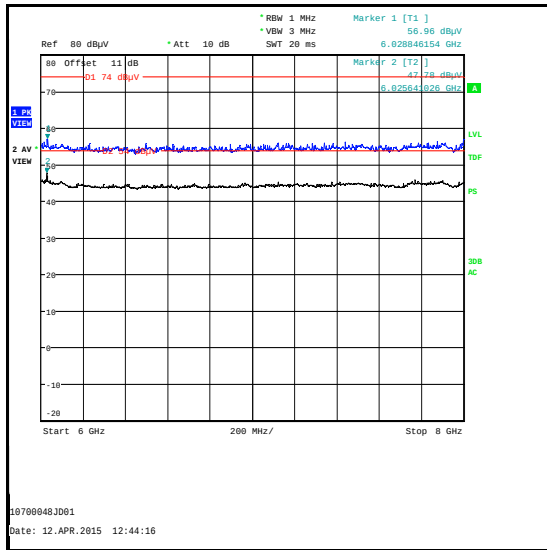
Results: Middle Channel / BPSK / Peak / Sectorised Antenna

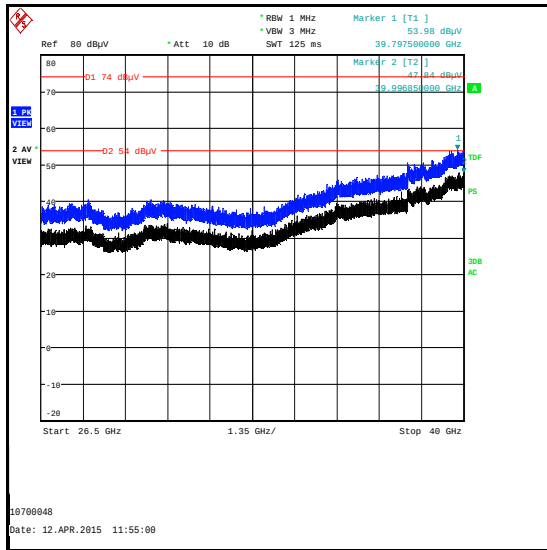


Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Omnidirectional Antenna**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5907.452	Vertical	63.5	93.8	30.3	Complied



Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Omnidirectional Antenna**

Transmitter Radiated Emissions (continued)**Results: Middle Channel / BPSK / Peak / Omnidirectional Antenna**

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

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1782	Thermohygrometer	JM Handelspunkt	30.5015.10	Not stated	24 Apr 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	30 Apr 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	Calibrated before use	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 May 2015	12
A2176	High Pass Filter	AtlanTecRF	AFH-07000	800980	Calibrated before use	-
A2134	Low Pass Filter	AtlanTecRF	AFL-05000	300195	25 Apr 2015	12
L1097	Low Pass Filter	AtlanTecRF	AS6573	13022102350	Calibrated before use	-
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
A1878	WG22 to Coax Adaptor	Quasar Microwave	QRA22PQB 402BKF	None stated	Calibrated before use	-
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
A1785	Pre Amplifier	Farran Technology	FLNA-28-30	FTL 6483	09 Jan 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	-

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.

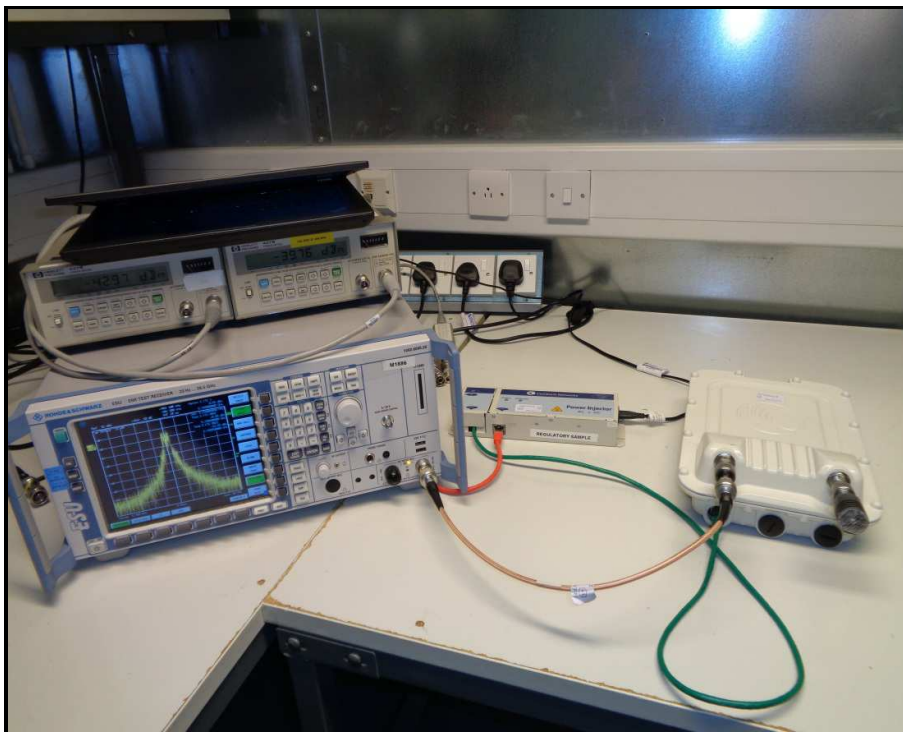
The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical 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	9 10 130 137	-	Added Note 4 Notes updated Notes updated Notes updated

Appendix 1. Conducted Test Setup Photograph

EUT configuration for conducted measurements

--- END OF REPORT---