



TEST REPORT

Test Report No. : UL-RPT-RP10655468JD03A V2.0

Manufacturer : Cambium Networks Ltd
Model No. : PMP 450i / PTP 450i
FCC ID : QWP-50450I
Test Standard(s) : FCC Parts 15.207, 15.209(a), 15.403(i), 15.407(a)(2), 15.407(b), 15.407(g) & 15.407(h)(1)

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

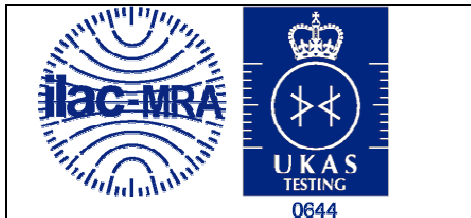
Date of Issue: 26 November 2015

Checked by:

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

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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:	47CFR15.403 and 47CFR15.407
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.403 and 15.407
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:	FCC: 209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	27 June 2015 to 12 August 2015

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.403(i)	Transmitter 26 dB Emission Bandwidth	
Part 15.407(a)(2)	Transmitter Maximum Conducted Output Power	
Part 15.407(a)(2)	Transmitter Peak Power Spectral Density	
Part 15.407(b)/ 15.209(a)	Transmitter Out of Band Radiated Emissions	
Part 15.407(b)/ 15.209(a)	Transmitter Band Edge Radiated Emissions	
Part 15.407(b)/ 15.209(a)	Transmitter Band Edge Conducted Emissions	
Part 15.407(g)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Note 1
Part 15.407(h)(1)	Transmitter Power Control	
Key to Results		
 = Complied  = Did not comply		

Note(s):

- Frequency stability is better than 10 ppm, which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.
- Dynamic Frequency Selection test results are contained in a separate report, UL-RPT-RP10655468JD03D V2.0.

2.3. Methods and Procedures

Reference:	ANSI C63.10-2009
Title:	American National Standard for Testing Unlicensed Wireless Devices
Reference:	FCC KDB 789033 D02 v01 June 6, 2014
Title:	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E
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, June 3 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 specifications identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Cambium Networks Ltd
Model Name or Number:	PMP 450i / PTP 450i
Hardware Version:	P3
Software Version:	B176-PXP455-PRODTEST
Serial Number:	F50980BB0152
FCC ID:	QWP-50450I

Brand Name:	Cambium Networks Ltd
Model Name or Number:	PMP450i
Hardware Version:	P3
Software Version:	B176-PXP455-PRODTEST
Serial Number:	F50980BB016F
FCC ID:	QWP-50450I

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

Description:	PoE Power supply
Brand Name:	Cambium Networks
Model Name or Number:	E100109B G
Part Number:	C000065L002B
Serial Number:	1421005533

3.2. Description of EUT

The Equipment Under Test was a fixed radio transceiver operating in the 5250-5350 MHz and 5470-5725 MHz frequency bands. The EUT is available in two configurations:

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

Power is provided by a PoE supply.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:		Unlicensed National Information Infrastructure (U-NII-2A & U-NII-2C)				
Type of Unit:		Microwave fixed radio link transceiver				
Modes/Modulation:		QPSK, 16QAM, 64QAM & 256QAM				
Data rates:		32.4, 64.6, 97.1 & 129.5 Mbit/s				
Power Supply Requirement(s):		Nominal		PoE supply input 120 VAC 60 Hz. PoE output 48 VDC.		
Maximum Conducted Output Power:		16.0 dBm (when used in conjunction with omnidirectional antenna)				
Frequency Range:		5250 MHz to 5350 MHz / 4' Parabolic Antenna				
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	5252.5	5252.5	5298	5343	5343
	10	5255	5255	5298	5340.5	5340.5
	20	5260	5260	5298	5330	5333.75
Frequency Range:		5470 MHz to 5725 MHz / 2' Parabolic Antenna				
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	5473	5475.25	5597	5719.5	5721.25
	10	5475.5	5479.25	5595	5714.75	5719.25
	20	5480	5492	5590	5703	5715

Additional Information Related to Testing (continued)

Frequency Range:		5250 MHz to 5350 MHz / Flat Plate Antenna				
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	5252.5	5252.5	5298	5343	5343
	10	5255	5255	5298	5340.5	5340.5
	20	5260	5260	5298	5330	5333.75
Frequency Range:		5470 MHz to 5725 MHz / Flat Plate Antenna				
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	5473	5475	5597	5719.25	5721.75
	10	5475.5	5479.5	5595	5715.75	5719.25
	20	5480	5491.5	5590	5703.25	5715
Frequency Range:		5250 MHz to 5350 MHz / Sectorised Antenna				
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	5252.5	5252.5	5298	5343	5343
	10	5255	5255	5298	5340.5	5340.5
	20	5260	5260	5298	5330	5333.75
Frequency Range:		5470 MHz to 5725 MHz / Sectorised Antenna				
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	5472.5	5474	5597	5720.5	5722.5
	10	5475	5479	5595	5715.75	5720
	20	5480	5491.5	5590	5706	5715

Additional Information Related to Testing (continued)

Frequency Range:		5250 MHz to 5350 MHz / Omnidirectional Antenna				
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	5252.5	5252.5	5298	5343	5343
	10	5255	5255	5298	5340.5	5340.5
	20	5260	5260	5298	5330	5333.75
Frequency Range:		5470 MHz to 5725 MHz / Omnidirectional Antenna				
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	5472.5	5474	5597	5720.5	5722.5
	10	5475	5479	5595	5715.75	5720
	20	5480	5493.25	5590	5704	5715

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 some lower and higher channels. '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:	R9-019EA1 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 5250-5350 & 5470-5725 MHz bands. The antenna gains were stated by Cambium Networks Ltd:

Type	Stated Gain (dBi)	Manufacturer	Antenna Name	Used for Testing	Note
Dual polarised plate (Integrated)	23.0	MARS	MA-WA56-DP23SCM	-	1, 3
Dual polarised plate (Integrated)	17.0	Cambium	5093HH	-	1, 3
Dual polarised plate (External)	28.5	MARS	MA-WA56-DP28N	X	2
2 ft Parabolic Dual Polarised	28.5	MTI	MT-486013-NVH	X	4
4 ft Parabolic Dual Polarised	34.5	Andrews	PX4F-52-N7A/A	X	2, 5
90° Sectorised (External)	17.0	Laird	ANT, AP Sector	X	2
90° Sectorised (External)	17.0	Proprietary	Part No. A005189	-	1, 2
90° Sectorised (Integrated)	16.0	MARS	MA-WD56-DP16PCMW	-	1, 3
Omnidirectional	13.0	KP	KPPA-5.7-DPOMA	X	2
Omnidirectional	10.0	MARS	MA-WO56-DP10	-	1, 2

X = This antenna was used for testing purposes

Note(s):

- 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.
- 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.
- Integral antenna. No external RF cables.
- Tested in the 5.47-5.725 GHz Band only. Used in conjunction with two, 3 metre length RF cables (Times Microwave Systems LMR-200 coaxial with N type male – N type male) having an individual insertion loss of 2.9 dB across the EUT operating band. Cambium Networks Ltd requested that these cables were used during testing. The stated 2' parabolic antenna gain of 28.5 dBi includes the individual insertion loss of two, 1.7 metres length RF cables (Semi-rigid WA42961800, N type male – N type male). These cables were not used during testing. The insertion loss of the 1.7 metre cable was subtracted from the stated antenna gain figure and the insertion loss of the 3 metre cable was added to the antenna gain.

Stated gain = 28.5 dBi

Insertion loss of 1.7 metre RF cable = 1.1 dB

Insertion loss of 3 metre RF cable = 3.4 dB

Recalculated antenna gain = (Stated antenna gain) – (1.7 metre RF cable loss) + (3 metre RF cable loss)

Recalculated antenna gain = 28.5 dBi – (-1.1 dB) + (-3.4 dB) = 26.2 dBi

- For use in the 5.25-5.35 GHz Band only.

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.
- For test purposes only, the EUT was continuously transmitting at maximum power with 100% duty cycle in test mode on the required channels using the supported modulation types.

4.2. Configuration and Peripherals

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

- A laptop PC with Cambium Networks test application 'Regulatory RF Control V2.3' was used to configure the EUT via the PoE power supply and Ethernet cables.
- The EUT was powered throughout testing via the PoE power supply.
- The EUT was operating at maximum allowable output power for the configuration being tested unless otherwise stated.
- The EUT with serial number F50980BB0152 was used for AC conducted and band edge emissions tests.
- The EUT with serial number F50980BB016F was used for all other tests.
- 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. Where LCF, Mid Ch and HCF have the same values, then maximum power was used across the band from the bottom channel to the top channel. Corresponding channel frequencies are shown in Section 3.4 of this report.

The tables below show the EUT power settings that were used during testing for each channel bandwidth and modulation type when the EUT was tested with the parabolic antenna.

Power Settings Used For Testing / 4' Parabolic Antenna / 5250-5350 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	-13.75	-13.75	-13.75	-13.25	-13.25	-13.25	-13.25	-13.25	-13.25	-13.25	-13.25	-13.25
10	-10.75	-10.75	-10.75	-10.25	-10.25	-10.25	-10.25	-10.25	-10.25	-10.25	-10.25	-10.25
20	-7.75	-7.75	-7.75	-7.25	-7.25	-7.25	-7.25	-7.25	-7.25	-7.25	-7.25	-7.25

Power Settings Used For Testing / 2' Parabolic Antenna / 5470-5725 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	-10	-4.75	-10	-10	-4.75	-10	-10	-4.75	-10	-10	-4.75	-10
10	-7	-1.75	-7	-7	-1.75	-7	-7	-1.75	-7	-7	-1.75	-7
20	-12	1.25	-12	-12	1.25	-12	-12	1.25	-12	-12	1.25	-12

The tables below show the EUT power settings that were used during testing for each channel bandwidth and modulation type when the EUT was tested with the plate antenna.

Power Settings Used For Testing / Plate Antenna / 5250-5350 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75
10	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75
20	-0.75	-0.75	-3	-0.75	-0.75	-3	-0.75	-0.75	-3	-0.75	-0.75	-3

Power Settings Used For Testing / Plate Antenna / 5470-5725 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	-11.5	-6.75	-11.5	-11.5	-6.75	-11.5	-11.5	-6.75	-11.5	-11.5	-6.75	-11.5
10	-9.5	-3.75	-9.5	-9.5	-3.75	-9.5	-9.5	-3.75	-9.5	-9.5	-3.75	-9.5
20	-13	-0.75	-13	-13	-0.75	-13	-13	-0.75	-13	-13	-0.75	-13

Power settings used during testing (continued)

The tables below show the EUT power settings that were used during testing for each channel bandwidth and modulation type when the EUT was tested with the sectorised antenna.

Power Settings Used For Testing / Sectorised Antenna / 5250-5350 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
10	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25
20	12.25	12.25	7.5	12.25	12.25	7.5	12.25	12.25	7.5	12.25	12.25	7.5

Power Settings Used For Testing / Sectorised Antenna / 5470-5725 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	-6	6.25	-6	-6	6.25	-6	-6	6.25	-6	-6	6.25	-6
10	-1	9.25	-1	-1	9.25	-1	-1	9.25	-1	-1	9.25	-1
20	3.5	12.25	3.5	3.5	12.25	3.5	3.5	12.25	3.5	3.5	12.25	3.5

The tables below show the EUT power settings that were used during testing for each channel bandwidth and modulation type when the EUT was tested with the omnidirectional antenna.

Power Settings Used For Testing / Omnidirectional Antenna / 5250-5350 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25	10.25
10	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25
20	16.25	16.25	14	16.25	16.25	14	16.25	16.25	14	16.25	16.25	14

Power Settings Used For Testing / Omnidirectional Antenna / 5470-5725 MHz Band

Ch. BW	QPSK			16QAM			64QAM			256QAM		
	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF	LCF	Mid Ch	HCF
5	0.75	10.25	0.75	0.75	10.25	0.75	0.75	10.25	0.75	0.75	10.25	0.75
10	5.5	13.25	5.5	5.5	13.25	5.5	5.5	13.25	5.5	5.5	13.25	5.5
20	7.5	16.25	7.5	7.5	16.25	7.5	7.5	16.25	7.5	7.5	16.25	7.5

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 Dates:	04 July 2015 & 05 July 2015
Test Sample Serial Number:	F50980BB0152		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2

Environmental Conditions:

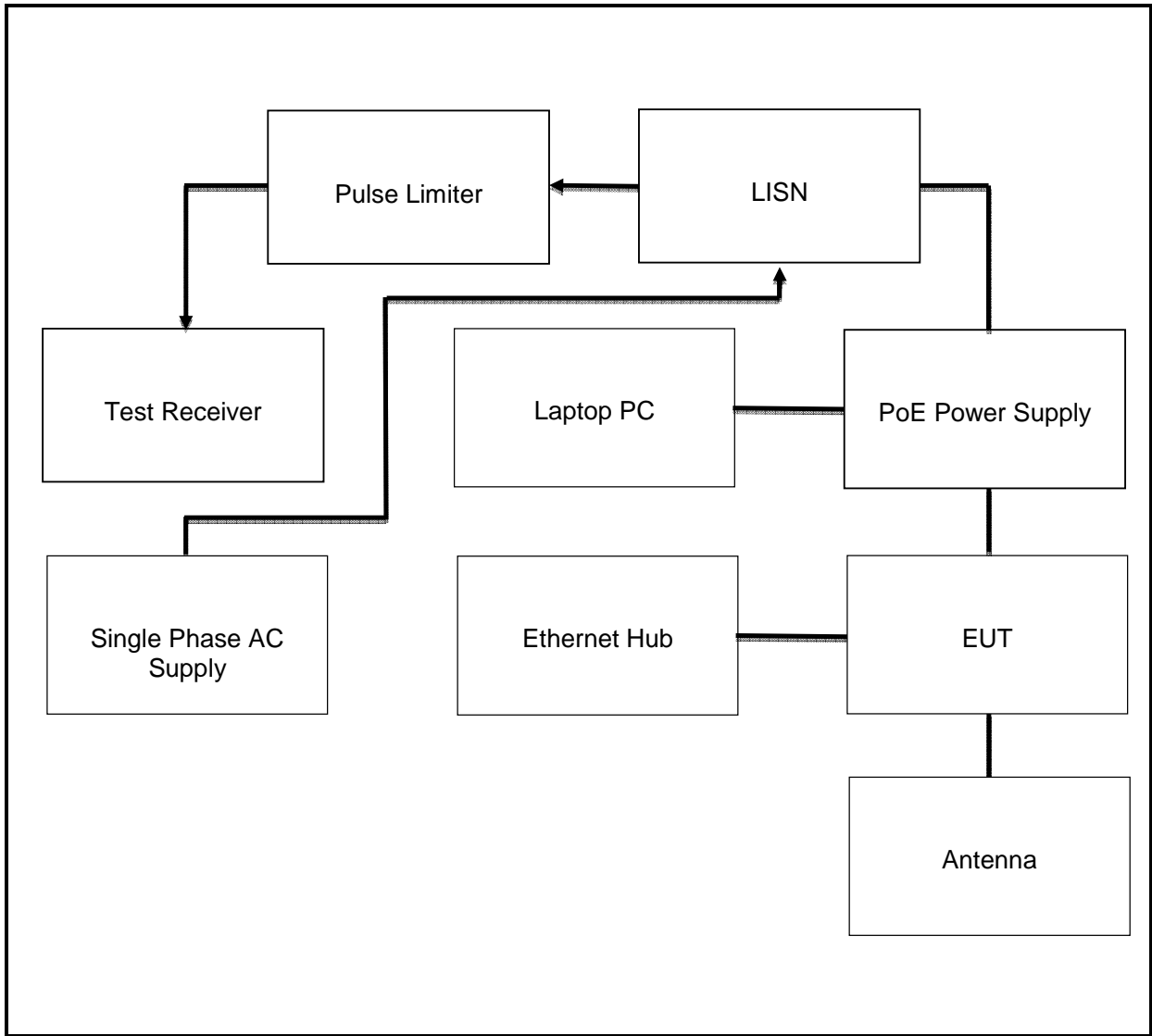
Temperature (°C):	23 to 25
Relative Humidity (%):	44 to 50

Note(s):

1. The manufacturer stated that two different PoE power supplies can be used with this product. AC conducted spurious emissions tests were performed on each power supply.
2. The input to the PoE power supply was connected to a 120 VAC 60 Hz single phase supply via a LISN during the testing. The output of the PoE power supply was connected to the input of the EUT via an Ethernet cable.
3. The EUT was transmitting at maximum power during the test on the middle channel of the 5.47-5.725 GHz band. A laptop PC was connected to the EUT via Ethernet. The unused Ethernet port on the EUT was terminated into an Ethernet hub.
4. The earth bonding point on the EUT was connected to the metal structure of the test chamber during testing.
5. All emissions >20 dB below the applicable limits were not recorded.

Transmitter AC Conducted Spurious Emissions (continued)

Test setup for AC conducted spurious emissions measurements:



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

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.164	Live	49.5	65.3	15.8	Complied
0.294	Live	48.1	60.4	12.3	Complied
0.416	Live	39.4	57.5	18.1	Complied
0.848	Live	37.5	56.0	18.5	Complied
1.392	Live	36.8	56.0	19.2	Complied

Results: Live / Average / LEADER Power Supply

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159	Live	40.4	55.5	15.1	Complied
0.290	Live	43.7	50.5	6.8	Complied
0.416	Live	36.3	47.5	11.2	Complied
0.906	Live	34.6	46.0	11.4	Complied
1.370	Live	31.8	46.0	14.2	Complied
3.156	Live	30.8	46.0	15.2	Complied

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

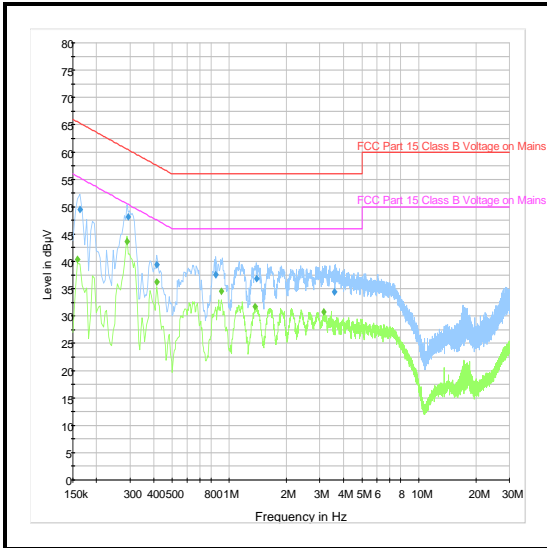
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159	Neutral	50.6	65.5	14.9	Complied
0.294	Neutral	48.6	60.4	11.8	Complied
0.411	Neutral	39.4	57.6	18.2	Complied
0.641	Neutral	38.4	56.0	17.6	Complied
1.127	Neutral	38.3	56.0	17.7	Complied
2.126	Neutral	37.7	56.0	18.3	Complied

Results: Neutral / Average / LEADER Power Supply

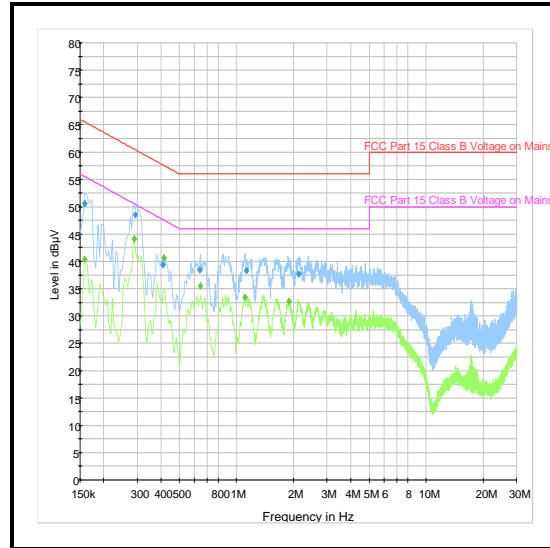
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159	Neutral	40.3	55.5	15.2	Complied
0.290	Neutral	44.1	50.5	6.4	Complied
0.416	Neutral	40.6	47.5	6.9	Complied
0.645	Neutral	35.5	46.0	10.5	Complied
1.109	Neutral	33.4	46.0	12.6	Complied
1.887	Neutral	32.7	46.0	13.3	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: LEADER Power Supply



Live



Neutral

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

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

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.173	Live	45.2	64.8	19.6	Complied

Results: Live / Average / Cambium Networks Power Supply

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.173	Live	37.2	54.8	17.6	Complied
0.258	Live	36.1	51.5	15.4	Complied
0.812	Live	31.3	46.0	14.7	Complied
1.113	Live	30.3	46.0	15.7	Complied
2.099	Live	30.7	46.0	15.3	Complied
14.388	Live	30.5	50.0	19.5	Complied

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

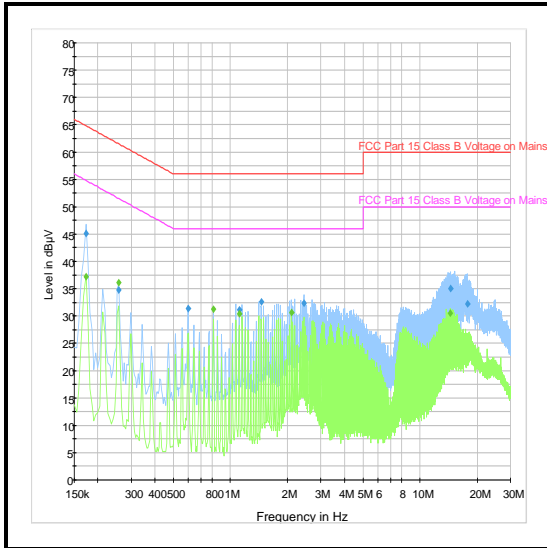
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.173	Neutral	45.8	64.8	19.0	Complied

Results: Neutral / Average / Cambium Networks Power Supply

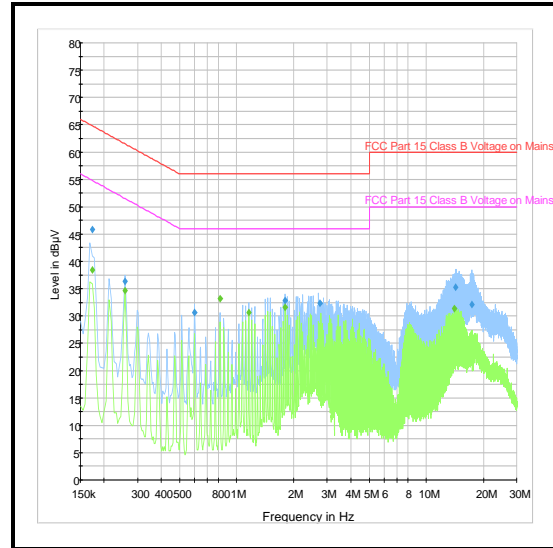
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.173	Neutral	38.5	54.8	16.3	Complied
0.258	Neutral	34.6	51.5	16.9	Complied
0.816	Neutral	33.2	46.0	12.8	Complied
1.158	Neutral	30.7	46.0	15.3	Complied
1.802	Neutral	31.7	46.0	14.3	Complied
14.037	Neutral	31.4	50.0	18.6	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Cambium Networks Power Supply



Live



Neutral

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	27 Nov 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. Transmitter 26 dB Emission Bandwidth**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Dates:	29 June 2015 & 23 July 2015
Test Sample Serial Number:	F50980BB016F		

FCC Reference:	Part 15.403(i)
Test Method Used:	FCC KDB 789033 Section II.C

Environmental Conditions:

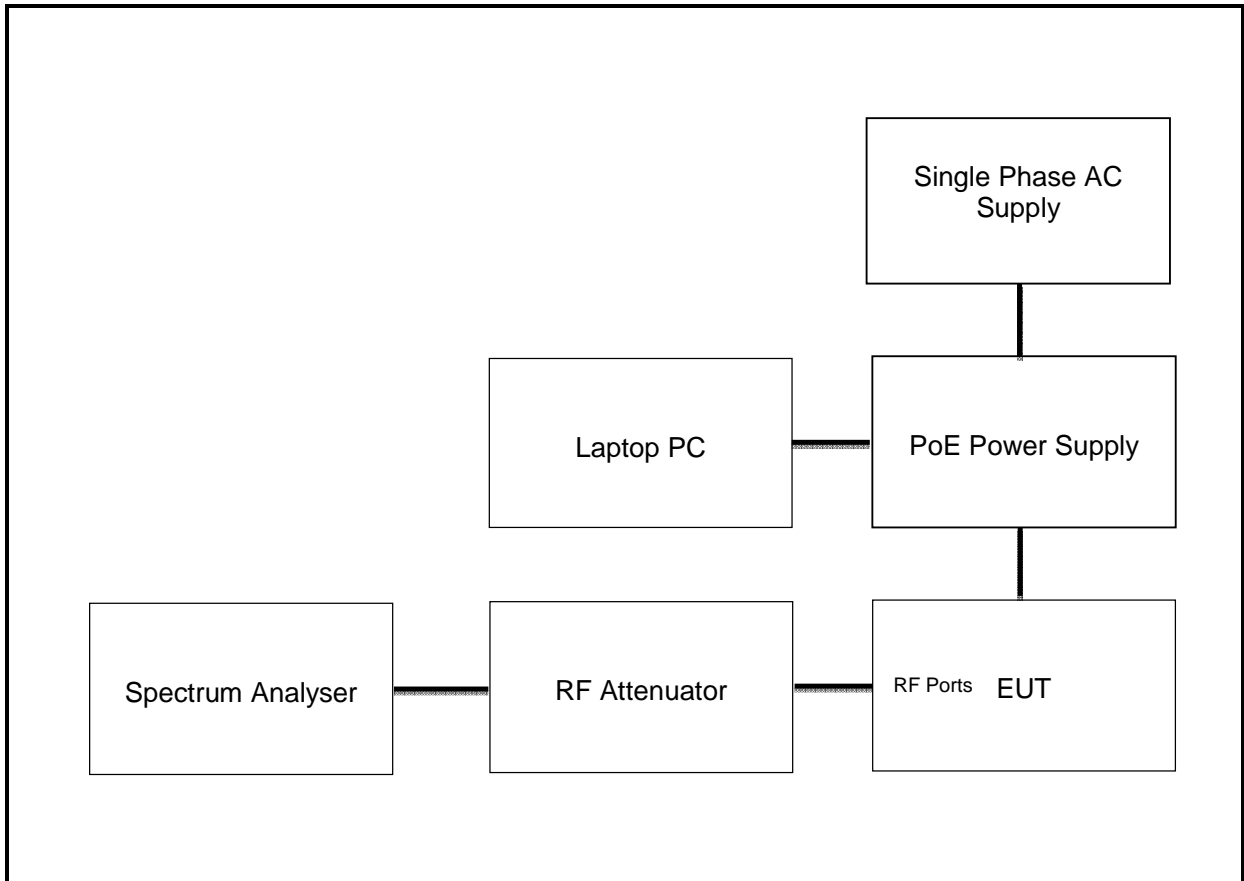
Temperatures (°C):	23 to 25
Relative Humidity (%):	42 to 47

Note(s):

1. All configurations supported by the EUT were investigated on one channel in accordance with KDB 789033 Section II.C emission bandwidth test procedure. Spot checks were performed with the EUT transmitting at maximum power using all channel bandwidths and modulation types. For each channel bandwidth, the measured occupied bandwidth was found to be identical in all modes. Final measurements were performed with the EUT transmitting QPSK modulation only.
2. Plots for all configurations are archived on the UL VS LTD IT server and available for inspection upon request.
3. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.
4. Final measurements were performed in each supported operating band using the above configurations on the bottom, middle and top channels in both operating bands. Both RF ports show identical characteristics. The spectrum analyser was connected to the A port for all final measurements.
5. An RF level offset of 21.1 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 30 dB was used.

Transmitter 26 dB Emission Bandwidth (continued)

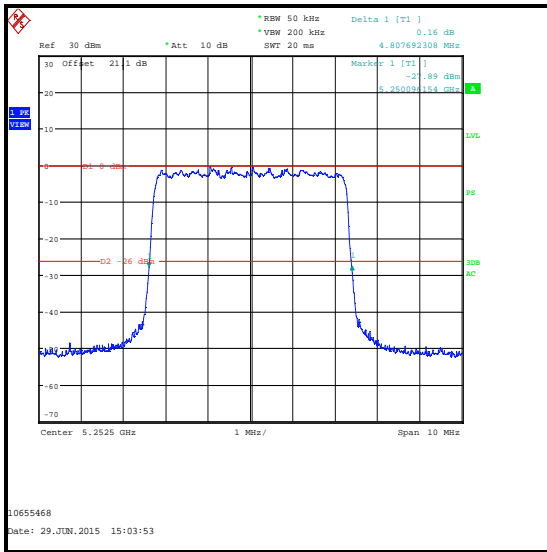
Test setup for bandwidth measurements:



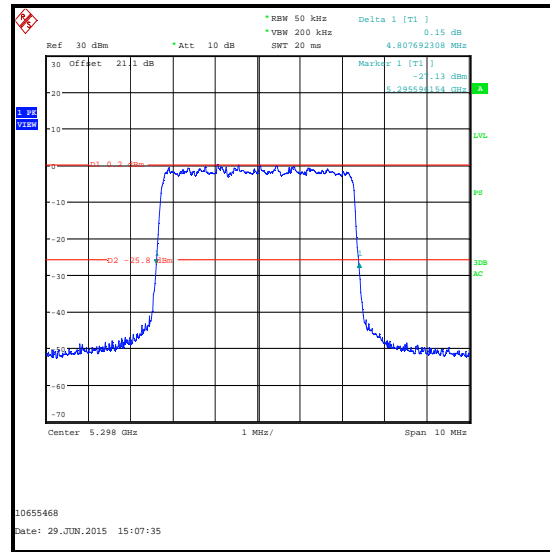
Transmitter 26 dB Emission Bandwidth (continued)

Results: 5.25-5.35 GHz Band / 5 MHz Channel / QPSK / A Port

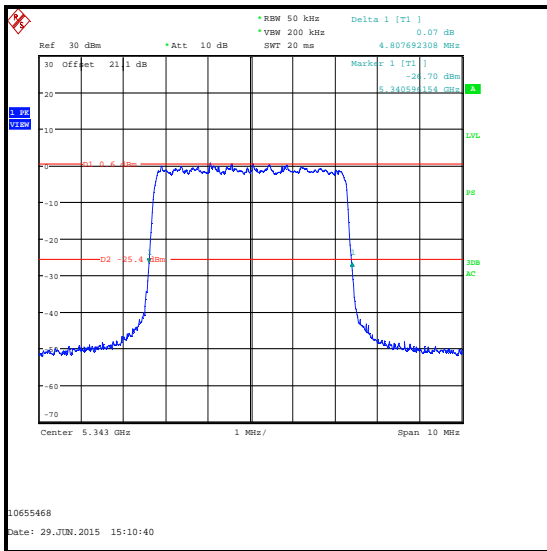
Channel	Frequency	Modulation	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26 dB Bandwidth (MHz)
Bottom	5252.5	QPSK	50	200	4.808
Middle	5298	QPSK	50	200	4.808
Top	5343	QPSK	50	200	4.808



Bottom Channel



Middle Channel

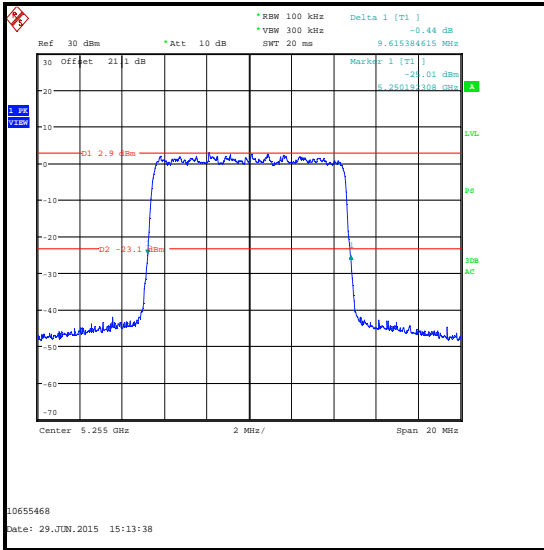


Top Channel

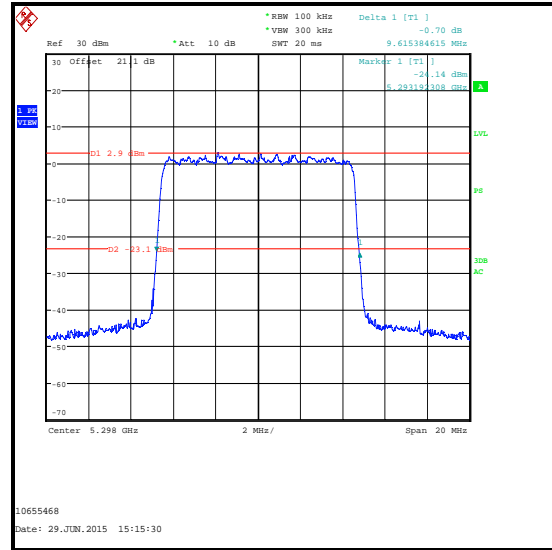
Transmitter 26 dB Emission Bandwidth (continued)

Results: 5.25-5.35 GHz Band / 10 MHz Channel / QPSK / A Port

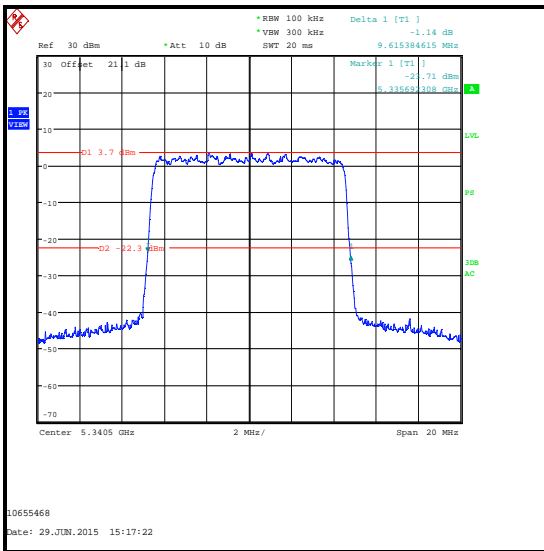
Channel	Frequency	Modulation	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26 dB Bandwidth (MHz)
Bottom	5255	QPSK	100	300	9.615
Middle	5298	QPSK	100	300	9.615
Top	5340.5	QPSK	100	300	9.615



Bottom Channel



Middle Channel

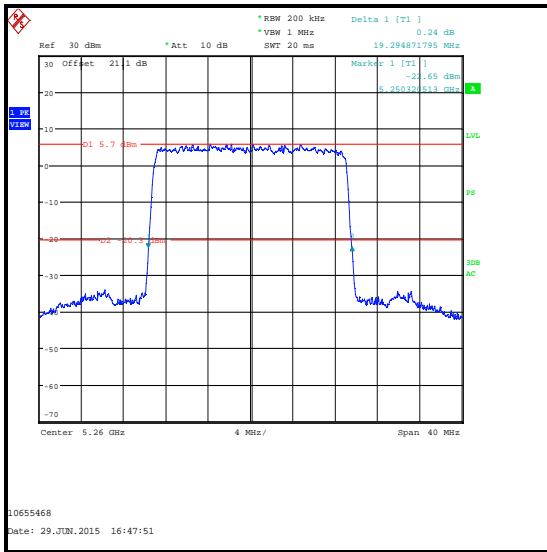


Top Channel

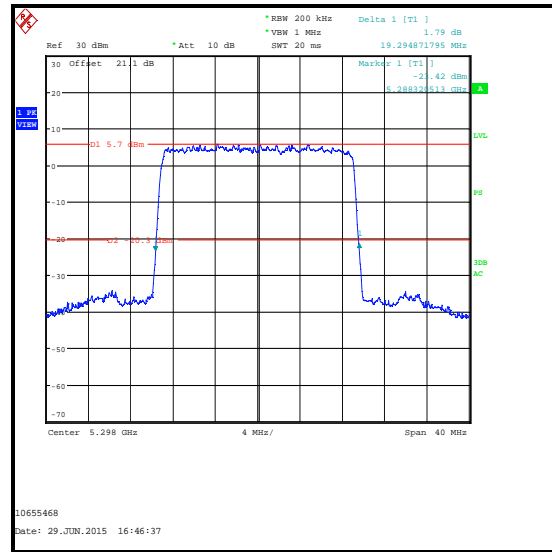
Transmitter 26 dB Emission Bandwidth (continued)

Results: 5.25-5.35 GHz Band / 20 MHz Channel / QPSK / A Port

Channel	Frequency	Modulation	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26 dB Bandwidth (MHz)
Bottom	5260	QPSK	200	1000	19.295
Middle	5298	QPSK	200	1000	19.295
Top	5333.75	QPSK	200	1000	19.295



Bottom Channel



Middle Channel

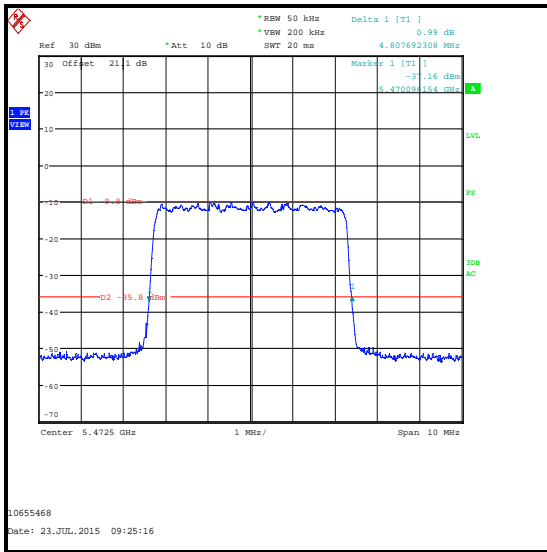


Top Channel

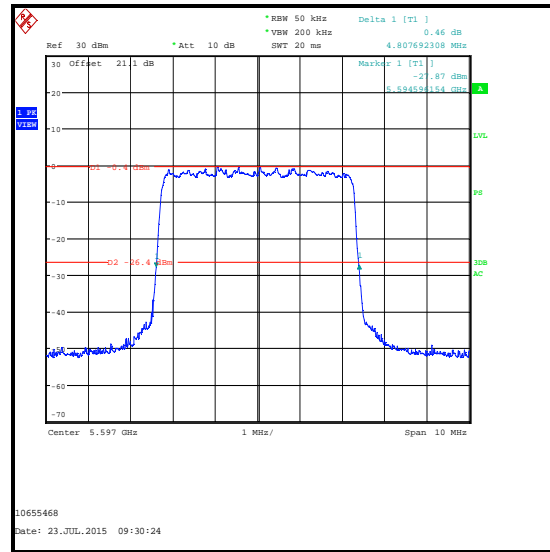
Transmitter 26 dB Emission Bandwidth (continued)

Results: 5.47-5.725 GHz Band / 5 MHz Channel / QPSK / A Port

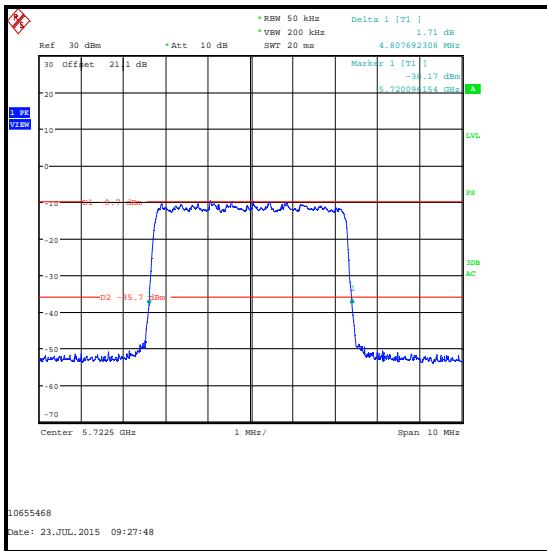
Channel	Frequency	Modulation	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26 dB Bandwidth (MHz)
Bottom	5472.500	QPSK	50	200	4.808
Middle	5597	QPSK	50	200	4.808
Top	5722.500	QPSK	50	200	4.808



Bottom Channel



Middle Channel

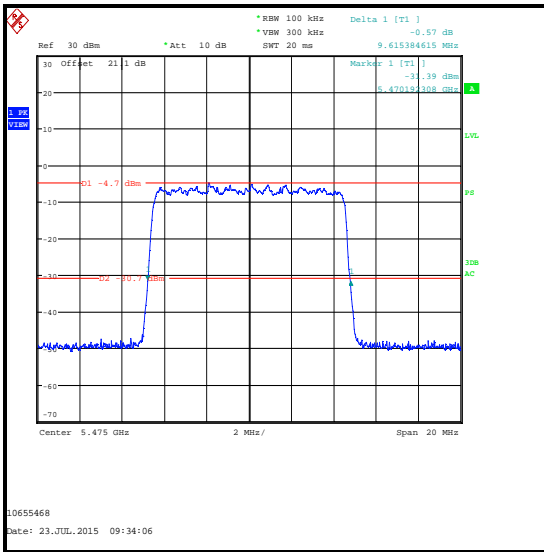


Top Channel

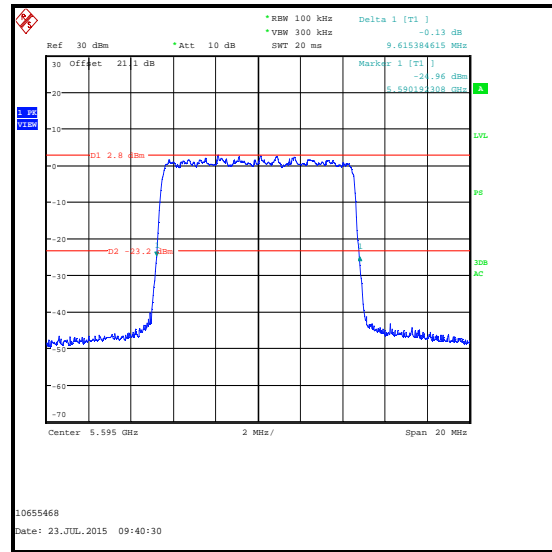
Transmitter 26 dB Emission Bandwidth (continued)

Results: 5.47-5.725 GHz Band / 10 MHz Channel / QPSK / A Port

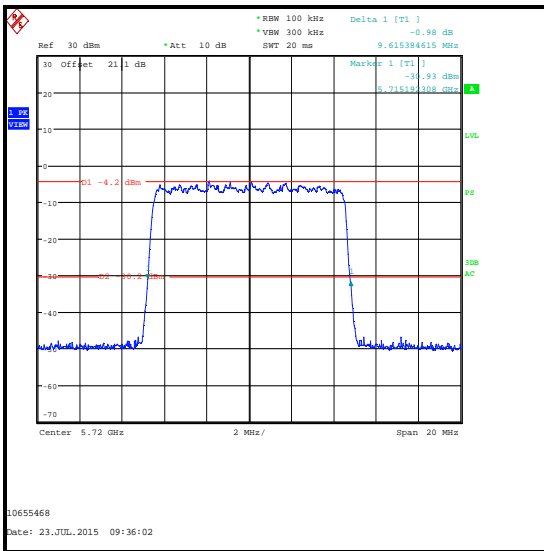
Channel	Frequency	Modulation	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26 dB Bandwidth (MHz)
Bottom	5475	QPSK	100	300	9.615
Middle	5595	QPSK	100	300	9.615
Top	5720	QPSK	100	300	9.615



Bottom Channel



Middle Channel

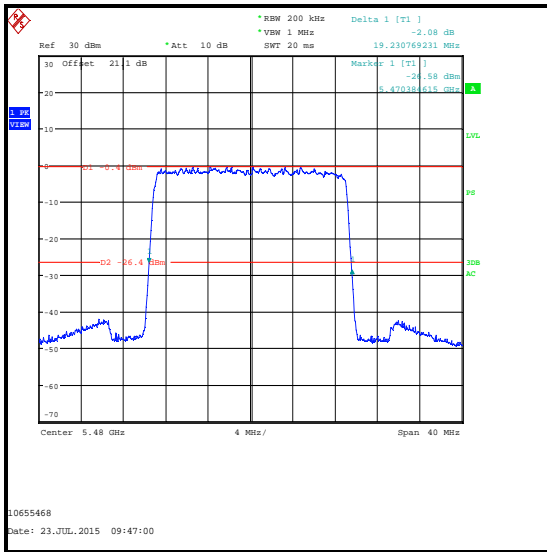


Top Channel

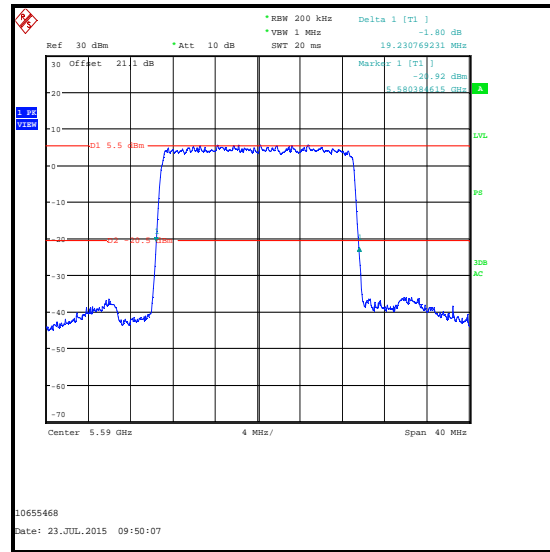
Transmitter 26 dB Emission Bandwidth (continued)

Results: 5.47-5.725 GHz Band / 20 MHz Channel / QPSK / A Port

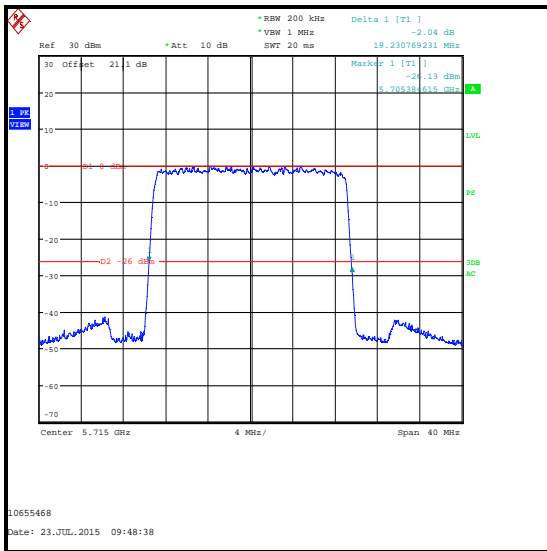
Channel	Frequency	Modulation	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26 dB Bandwidth (MHz)
Bottom	5480	QPSK	200	1000	19.231
Middle	5590	QPSK	200	1000	19.231
Top	5715	QPSK	200	1000	19.231



Bottom Channel



Middle Channel



Top Channel

Transmitter 26 dB Emission Bandwidth (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated Before Use	N/A
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	20 Feb 2016	12
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	24 Oct 2015	24
M1785	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12

5.2.3. Transmitter Maximum Conducted Output Power (5.25-5.35 & 5.47-5.725 GHz Bands)**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Dates:	01 July 2015 to 27 July 2015
Test Sample Serial Number:	F50980BB016F		

FCC Reference:	Part 15.407(a)(2)
Test Method Used:	FCC KDB 789033 D02 Section II.E.3.a Method PM

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	50 to 53

Note(s):

- Tests were performed with the EUT transmitting at its lowest and highest configurable output power and >99% duty cycle. Minimum output power occurs when the EUT is connected to the highest gain antenna (4' parabolic antenna in the 5.25-5.35 GHz band and plate antenna in the 5.47-5.725 GHz band). Maximum output power occurs when the EUT is used in conjunction with the lowest gain antenna (omnidirectional).
- All conducted power measurements were made using an RF average power meter in accordance with FCC KDB 789033 Section II.E.3.a Method PM.
- All supported modes and channel widths were initially investigated on one channel. The mode that produced the highest power and therefore deemed worst case is recorded in the result tables shown in this section of the test report.
- Results for all supported modes and channel bandwidths are archived on the test laboratory IT server and available for inspection upon request.
- Measurements were performed in each supported operating band on the bottom, middle and top channels.
- The FCC Part 15.407(a)(2) limit is the lesser of 250 mW (24.0 dBm) or $11 \text{ dBm} + 10 \log_{10} B$, where B is the previously measured 26 dB emission bandwidth in MHz. The limit for each channel was calculated as below:

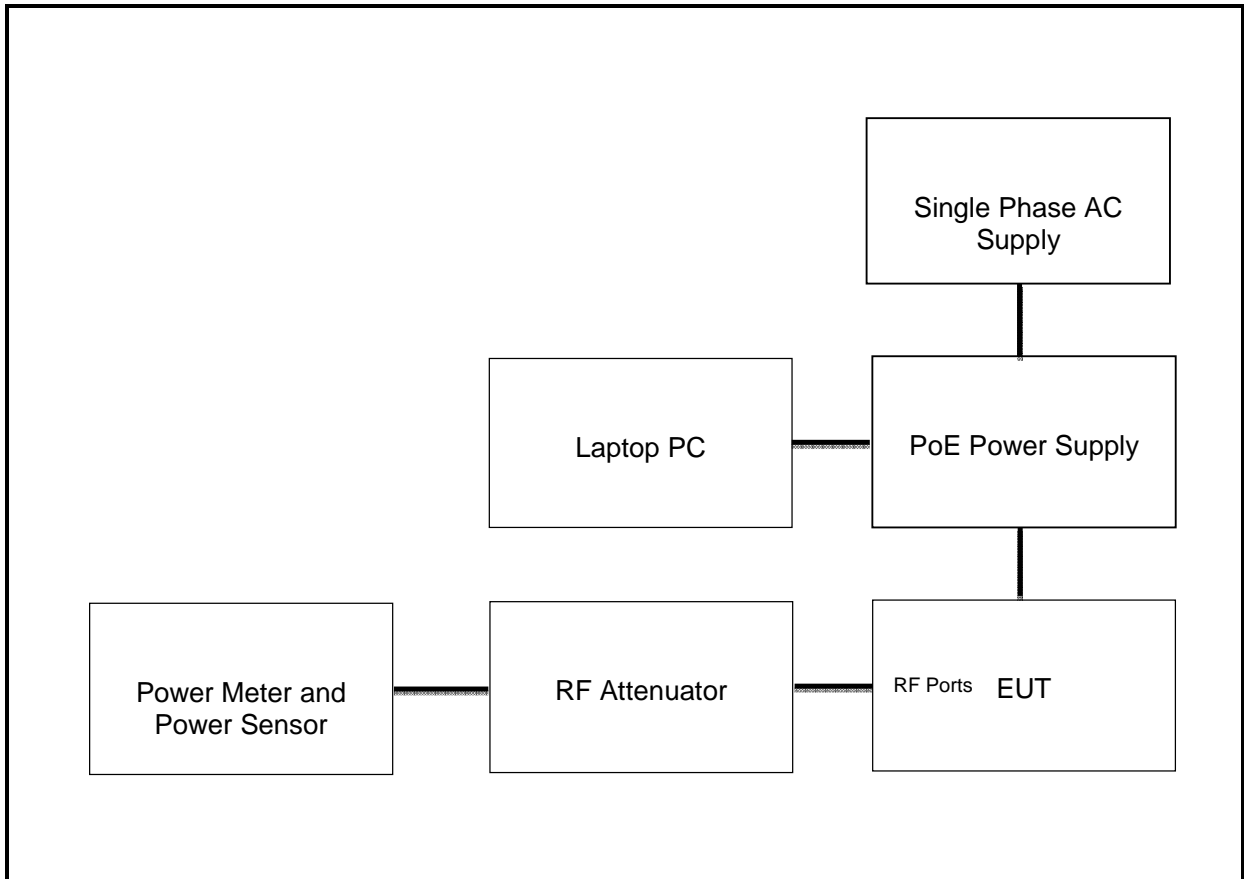
Conducted Power Limit Calculations 5.25-5.35 GHz Band
5 MHz channel width = $11 \text{ dBm} + 10 \log_{10} 4.808 = 17.8 \text{ dBm}$
10 MHz channel width = $11 \text{ dBm} + 10 \log_{10} 9.615 = 20.8 \text{ dBm}$
20 MHz channel width = $11 \text{ dBm} + 10 \log_{10} 19.295 = 23.9 \text{ dBm}$

Conducted Power Limit Calculations 5.47-5.725 GHz Band
5 MHz channel width = $11 \text{ dBm} + 10 \log_{10} 4.808 = 17.8 \text{ dBm}$
10 MHz channel width = $11 \text{ dBm} + 10 \log_{10} 9.615 = 20.8 \text{ dBm}$
20 MHz channel width = $11 \text{ dBm} + 10 \log_{10} 19.231 = 23.8 \text{ dBm}$

The lesser of the calculated and fixed limits was applied to the test results. The limits were further reduced by the amount that the stated antenna gain including RF cable loss exceeds 6 dBi. Limits for the omnidirectional antenna were reduced by 6.1 dB (13 dBi gain – 0.9 dB cable loss – 6 dB). Limits for the 4' parabolic antenna were reduced by 27.6 dB (34.5 dBi gain – 0.9 dB cable loss – 6 dB). Limits for the plate antenna were reduced by 21.6 dB (28.5 dBi gain – 0.9 dB cable loss – 6 dB).

Transmitter Maximum Output Power (continued)

Test setup for conducted power measurements:



Transmitter Maximum Output Power (5.25-5.35 GHz Band) (continued)**Results: 5 MHz Channel / QPSK / Omnidirectional Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	7.3	6.8	10.1	11.7	1.6	Complied
Middle	7.6	6.9	10.3	11.7	1.4	Complied
Top	7.9	6.7	10.4	11.7	1.3	Complied

Results: 5 MHz Channel / QPSK / Parabolic Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-15.2	-15.0	-12.1	-9.8	2.3	Complied
Middle	-15.2	-15.5	-12.3	-9.8	2.5	Complied
Top	-15.0	-15.8	-12.4	-9.8	2.6	Complied

Results: 10 MHz Channel / QPSK / Omnidirectional Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	10.2	9.8	13.0	14.7	1.7	Complied
Middle	10.5	9.7	13.1	14.7	1.6	Complied
Top	10.4	9.4	12.9	14.7	1.8	Complied

Results: 10 MHz Channel / QPSK / Parabolic Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-13.0	-12.8	-9.9	-6.8	3.1	Complied
Middle	-12.7	-12.7	-9.7	-6.8	2.9	Complied
Top	-12.7	-13.0	-9.8	-6.8	3.0	Complied

Transmitter Maximum Output Power (5.25-5.35 GHz Band) (continued)**Results: 20 MHz Channel / QPSK / Omnidirectional Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	12.8	12.3	15.6	17.8	2.2	Complied
Middle	13.4	12.6	16.0	17.8	1.8	Complied
Top	11.1	10.2	13.7	17.8	4.1	Complied

Results: 20 MHz Channel / QPSK / Parabolic Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-9.9	-10.1	-7.0	-3.7	3.3	Complied
Middle	-9.7	-10.6	-7.1	-3.7	3.4	Complied
Top	-9.4	-10.5	-6.9	-3.7	3.2	Complied

Transmitter Maximum Output Power (5.47-5.725 GHz Band) (continued)**Results: 5 MHz Channel / QPSK / Omnidirectional Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-0.2	-1.4	2.3	11.7	9.4	Complied
Middle	7.6	7.2	10.4	11.7	1.3	Complied
Top	-0.2	-1.5	2.2	11.7	9.5	Complied

Results: 5 MHz Channel / QPSK / Plate Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-12.4	-13.1	-9.7	-3.8	5.9	Complied
Middle	-8.3	-9.1	-5.7	-3.8	1.9	Complied
Top	-12.3	-13.2	-9.7	-3.8	5.9	Complied

Results: 10 MHz Channel / QPSK / Omnidirectional Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	2.8	2.5	5.7	14.7	9.0	Complied
Middle	10.5	10.1	13.3	14.7	1.4	Complied
Top	3.4	3.0	6.2	14.7	8.5	Complied

Results: 10 MHz Channel / QPSK / Plate Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-9.5	-11.3	-7.3	-0.8	6.5	Complied
Middle	-4.3	-6.3	-2.2	-0.8	1.4	Complied
Top	-9.4	-11.5	-7.3	-0.8	6.5	Complied

Transmitter Maximum Output Power (5.47-5.725 GHz Band) (continued)**Results: 20 MHz Channel / QPSK / Omnidirectional Antenna**

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	5.2	4.9	8.1	17.7	9.6	Complied
Middle	13.2	12.7	16.0	17.7	1.7	Complied
Top	5.7	5.3	8.5	17.7	9.2	Complied

Results: 20 MHz Channel / QPSK / Plate Antenna

Channel	Conducted Power A Port (dBm)	Conducted Power B Port (dBm)	Combined Conducted Power (dBm)	Conducted Power Limit (dBm)	Margin (dB)	Result
Bottom	-14.0	-16.3	-12.0	2.2	14.2	Complied
Middle	-1.4	-2.4	1.1	2.2	1.1	Complied
Top	-13.7	-16.1	-11.7	2.2	13.9	Complied

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1435	Power Meter	Hewlett Packard	437B	3125U14631	24 Apr 2016	12
M1009	Power Meter	Hewlett Packard	437B	3125U13706	27 Jan 2016	12
M1592	Power Sensor	Hewlett Packard	8487A	3318A02094	17 Sep 2015	12
M1175	Power Sensor	Hewlett Packard	8485A	2942A10299	11 Feb 2016	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	Calibrated Before Use	N/A
A2506	Attenuator	AtlanTecRF	AN18-10	821846#1	Calibrated Before Use	N/A
A2140	Attenuator	AtlanTecRF	AN18-10	090918-14	Calibrated Before Use	N/A
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	24 Oct 2015	24
M1785	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12

5.2.4. Transmitter Maximum Power Spectral Density (5.25-5.35 & 5.47-5.725 GHz Bands)**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Dates:	01 July 2015 to 12 August 2015
Test Sample Serial Number:	F50980BB016F		

FCC Reference:	Part 15.407(a)(2)
Test Method Used:	FCC KDB 789033 Section II.F referencing KDB 789033 II.E.2.b

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	50 to 53

Note(s):

- Tests were performed with the EUT transmitting at its maximum and minimum power control level. Minimum power control level occurs when the EUT is connected to the highest gain antenna (4' parabolic antenna in the 5.25-5.35 GHz band and plate antenna in the 5.47-5.725 GHz band). Maximum output power occurs when the EUT is used in conjunction with the lowest gain antenna (omnidirectional). The EUT was transmitting with >99% duty cycle. Various other antennas can be used and the manufacturer will reduce the maximum configurable output power by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- The peak power spectral density limit for the 4' parabolic antenna was recalculated as:

$$34.5 \text{ dBi (antenna gain)} - 0.9 \text{ dB (cable loss)} = 33.6 \text{ dBi}$$

$$33.6 \text{ dBi} - 6 \text{ dB} = 27.6 \text{ dB}$$
 The 11 dBm/MHz PSD limit was reduced by 27.6 dB to -16.6 dBm/MHz
- The peak power spectral density limit for the plate antenna was recalculated as:

$$28.5 \text{ dBi (antenna gain)} - 0.9 \text{ dB (cable loss)} = 27.6 \text{ dBi}$$

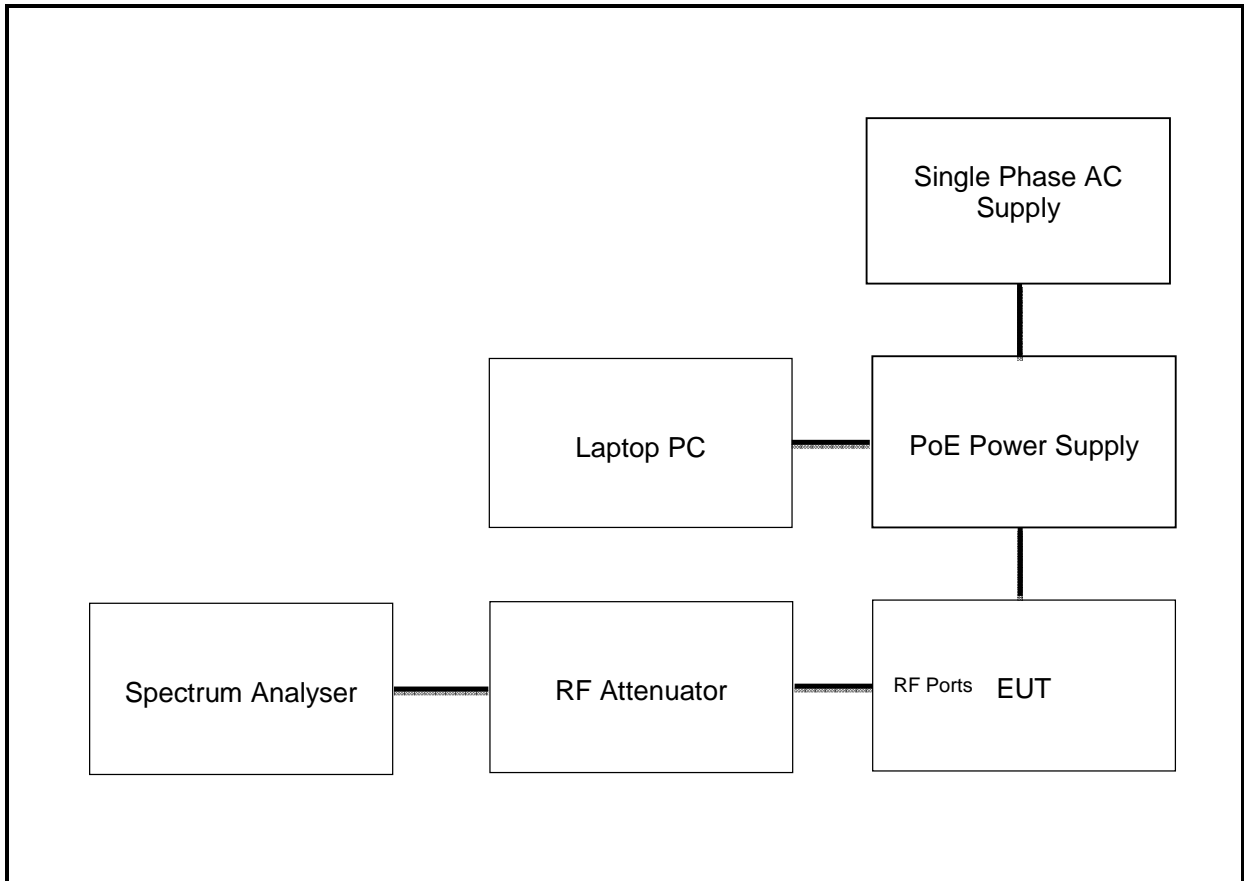
$$27.6 \text{ dBi} - 6 \text{ dB} = 21.6 \text{ dB}$$
 The 11 dBm/MHz PSD limit was reduced by 21.6 dB to -10.6 dBm/MHz
- The peak power spectral density limit for the omnidirectional antenna was recalculated as:

$$13 \text{ dBi (antenna gain)} - 0.9 \text{ dB (cable loss)} = 12.1 \text{ dBi}$$

$$12.1 \text{ dBi} - 6 \text{ dB} = 6.1 \text{ dB}$$
 The 11 dBm/MHz PSD limit was reduced by 6.1 dB to 4.9 dBm/MHz
- All supported modes and channel widths were initially investigated on one channel. Final measurements were performed using the worst case modulation type for each modulation family on the bottom, middle and top channels in all supported channel bandwidths. Maximum power spectral density was measured on both RF ports. The results were linearly combined and compared to the limit to obtain the margin.
- Transmitter Peak Power Spectral Density tests in all bands were performed using a calibrated spectrum analyser in accordance with FCC KDB 789033 II.E.2.b Method SA-1.
- The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cable.

Transmitter Maximum Power Spectral Density (continued)

Test setup for power spectral density measurements:

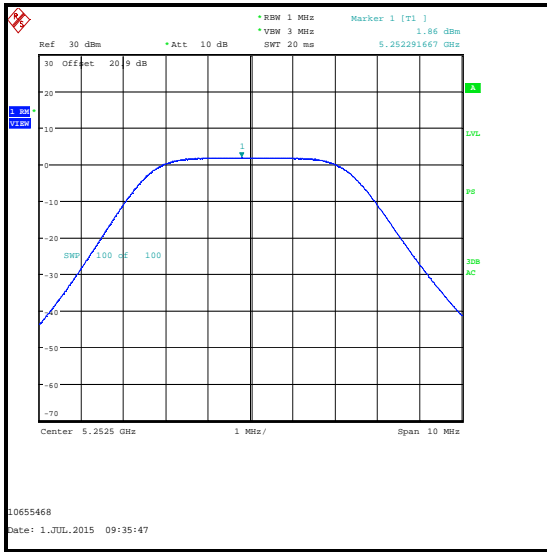


Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

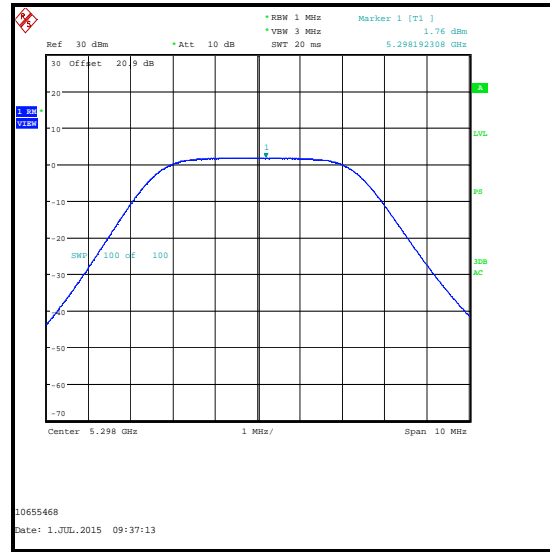
Results: Omnidirectional Antenna / 5 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	1.9	1.6	4.8	4.9	0.1	Complied
Middle	1.8	1.2	4.5	4.9	0.4	Complied
Top	1.9	1.3	4.6	4.9	0.3	Complied

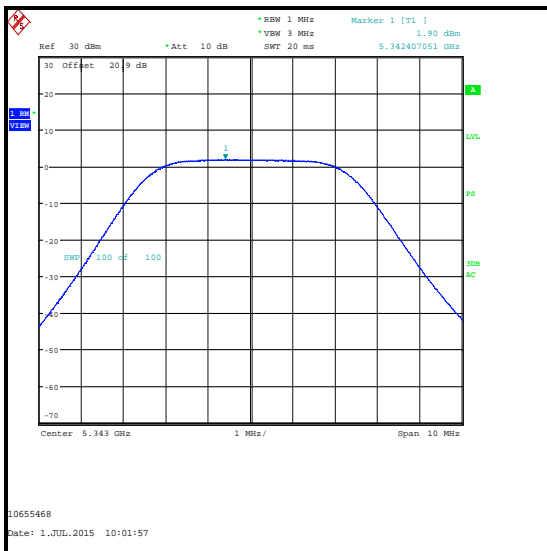
A Port



Bottom Channel



Middle Channel

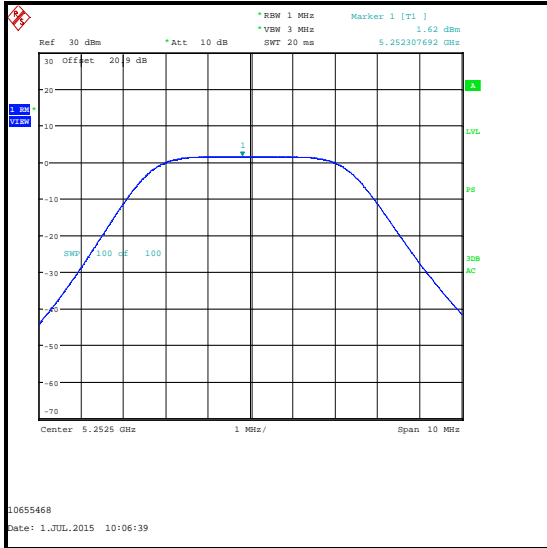


Top Channel

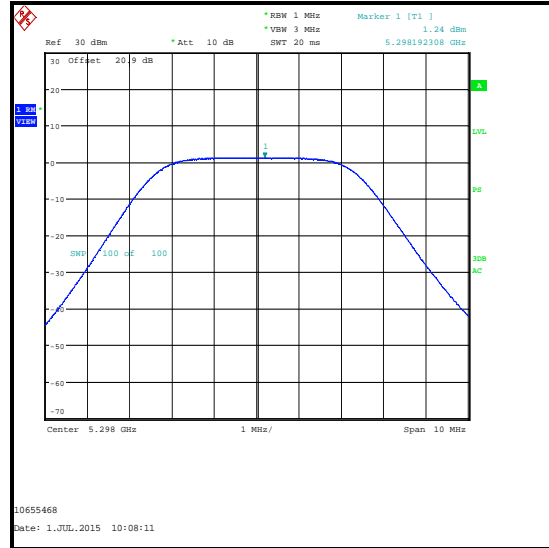
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 5 MHz Channel / QPSK

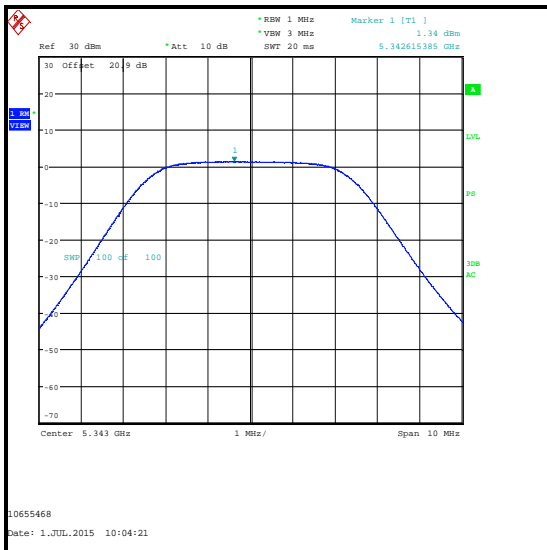
B Port



Bottom Channel



Middle Channel



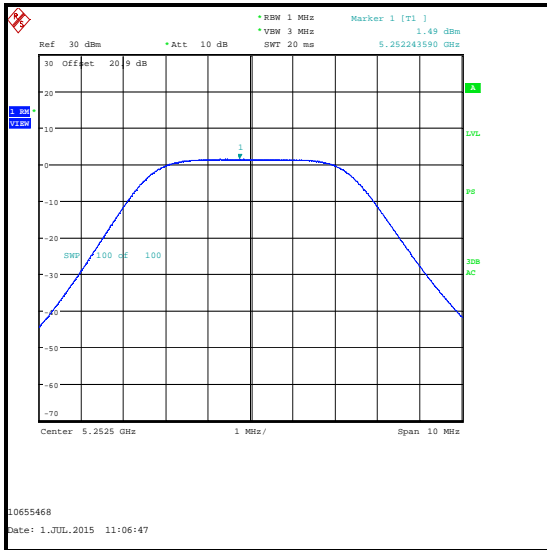
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

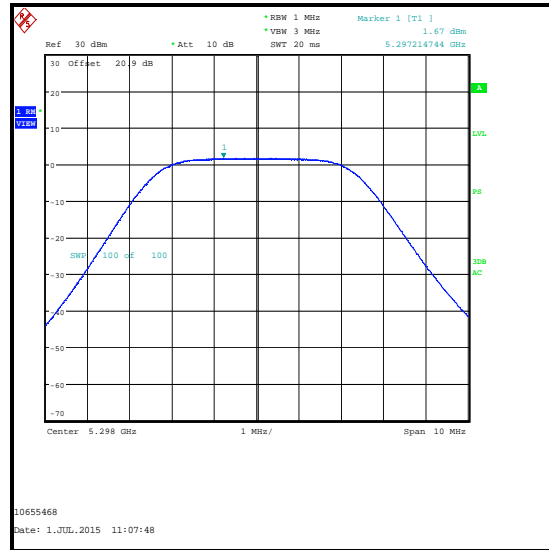
Results: Omnidirectional Antenna / 5 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	1.5	1.5	4.5	4.9	0.4	Complied
Middle	1.7	1.7	4.7	4.9	0.2	Complied
Top	1.8	1.8	4.8	4.9	0.1	Complied

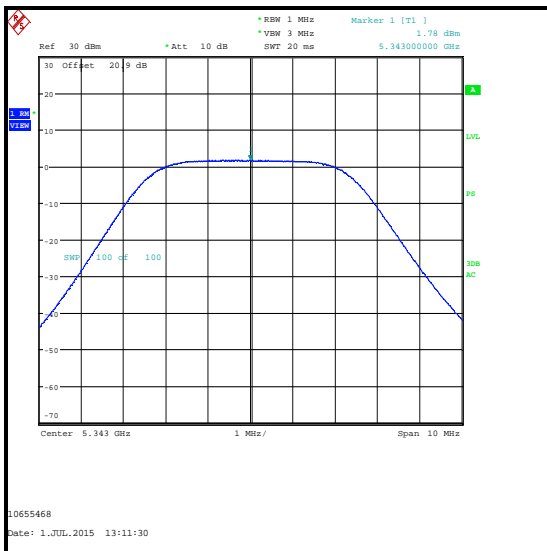
A Port



Bottom Channel



Middle Channel

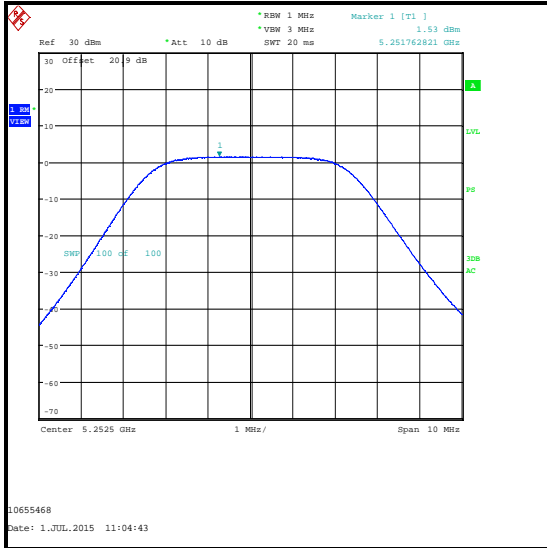


Top Channel

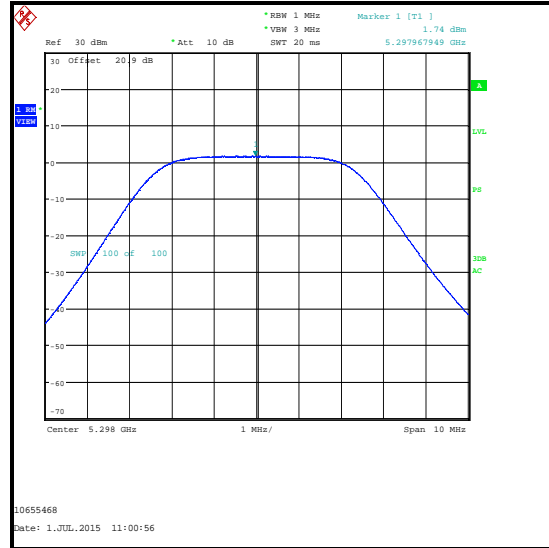
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 5 MHz Channel / 256QAM

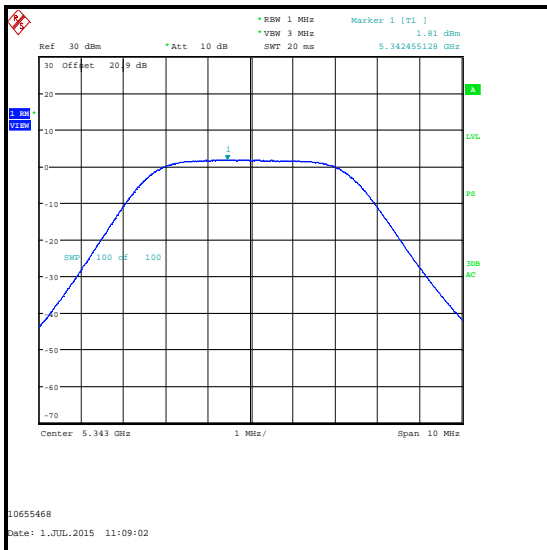
B Port



Bottom Channel



Middle Channel



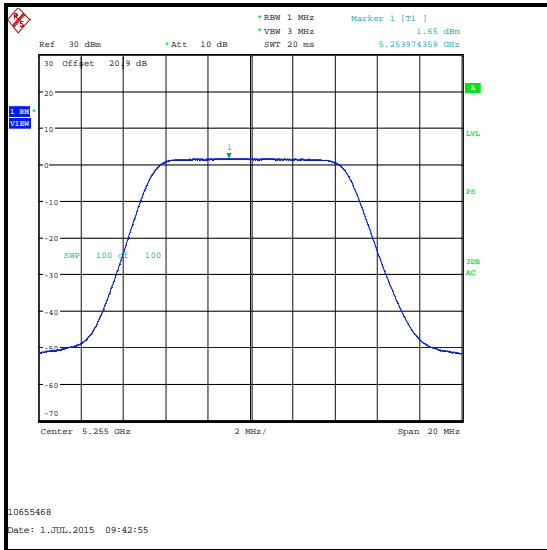
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

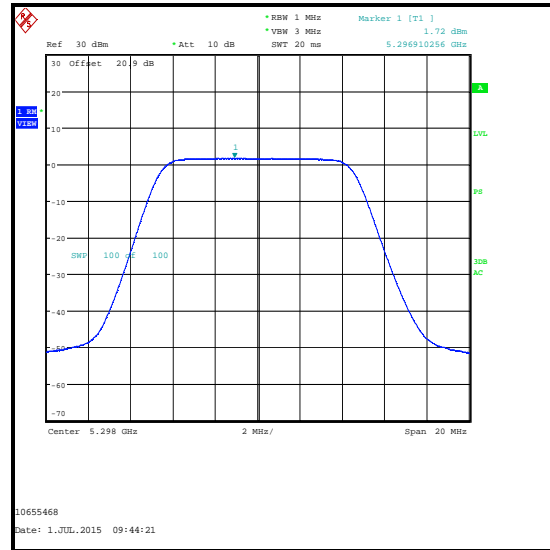
Results: Omnidirectional Antenna / 10 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	1.7	1.3	4.5	4.9	0.4	Complied
Middle	1.7	1.1	4.4	4.9	0.5	Complied
Top	1.7	1.2	4.5	4.9	0.4	Complied

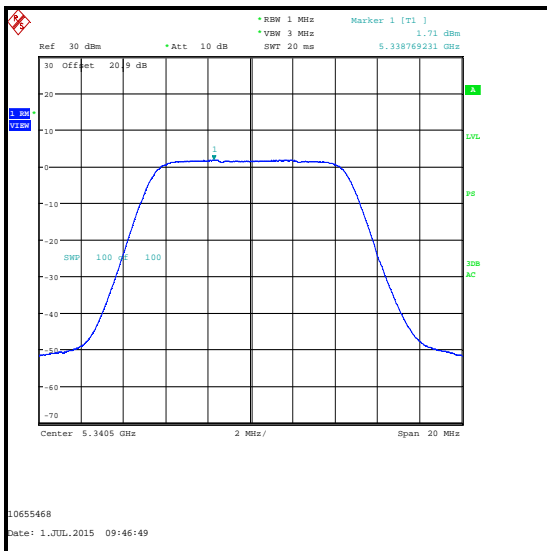
A Port



Bottom Channel



Middle Channel



Top Channel

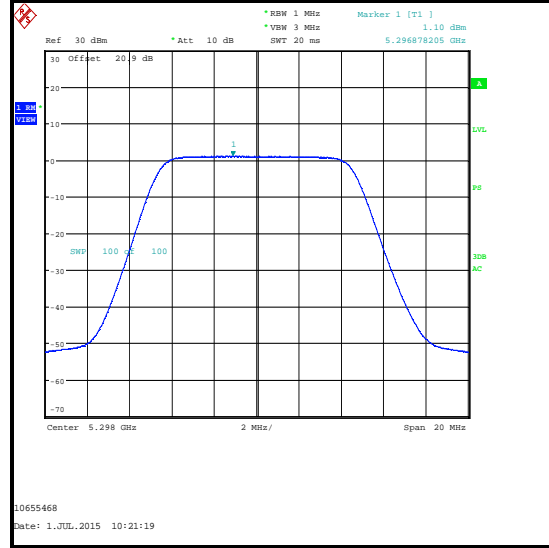
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 10 MHz Channel / QPSK

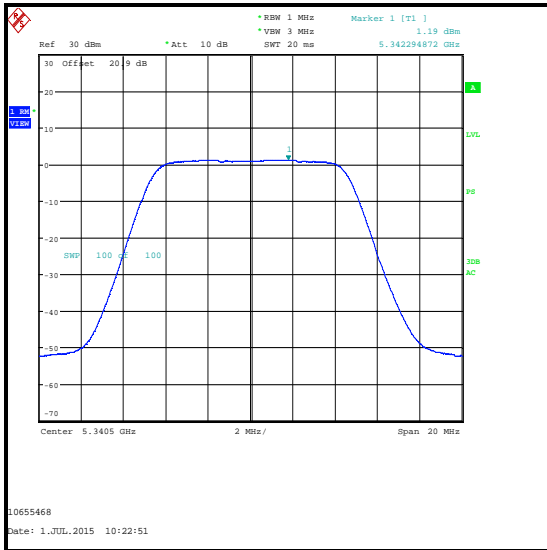
B Port



Bottom Channel



Middle Channel



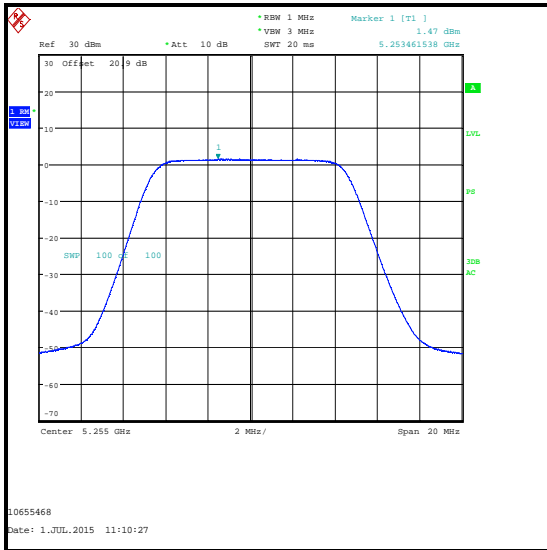
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

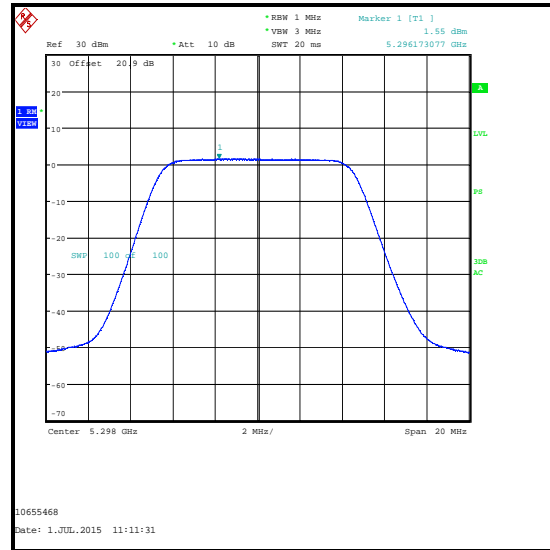
Results: Omnidirectional Antenna / 10 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	1.5	1.6	4.6	4.9	0.3	4.6
Middle	1.6	1.4	4.5	4.9	0.4	4.5
Top	1.8	1.4	4.6	4.9	0.3	4.6

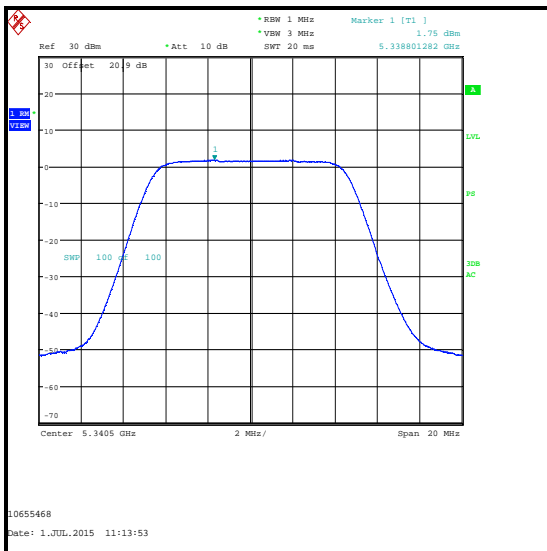
A Port



Bottom Channel



Middle Channel



Top Channel

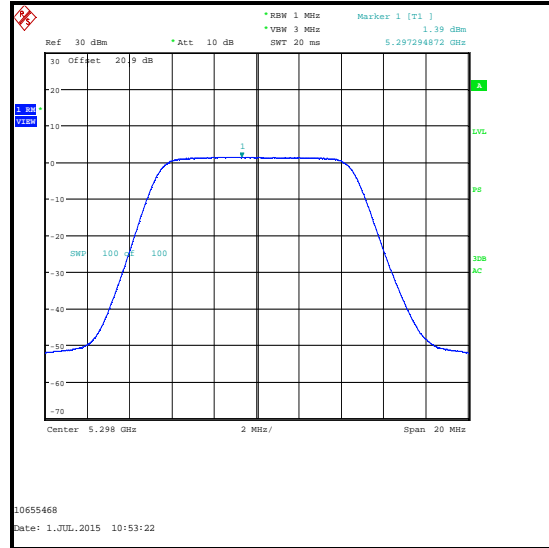
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 10 MHz Channel / 256QAM

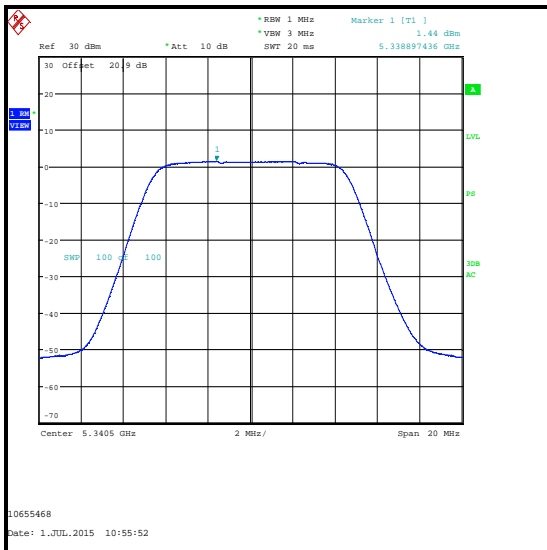
B Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	1.3	1.8	4.6	4.9	0.3	Complied
Middle	1.3	1.1	4.2	4.9	0.7	Complied
Top	-0.6	-0.8	2.3	4.9	2.6	Complied

A Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / QPSK

B Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	1.3	1.6	4.5	4.9	0.4	Complied
Middle	1.1	1.4	4.3	4.9	0.6	Complied
Top	-0.8	-1.0	2.1	4.9	2.8	Complied

A Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / 256QAM

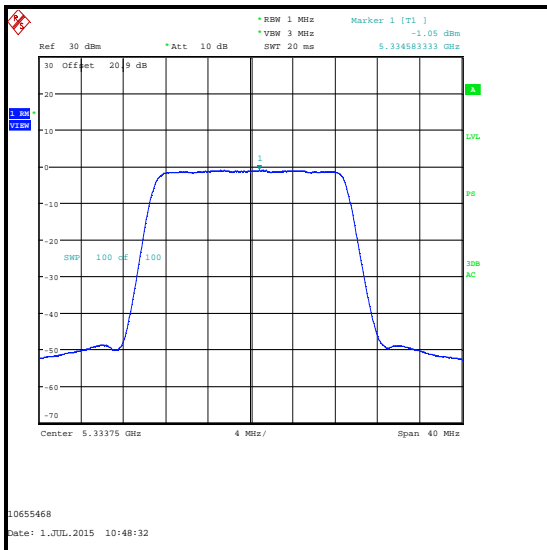
B Port



Bottom Channel



Middle Channel



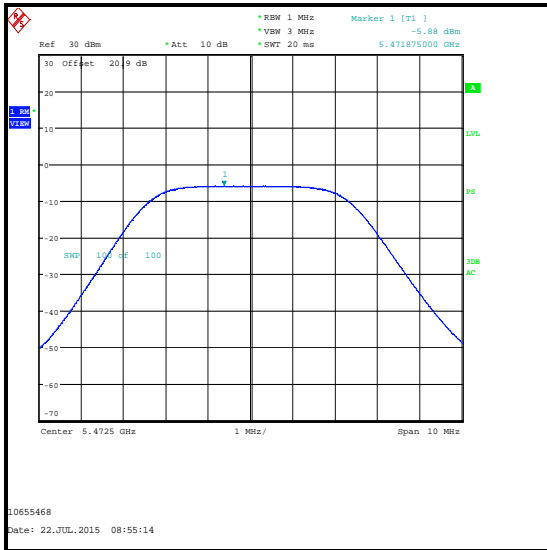
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

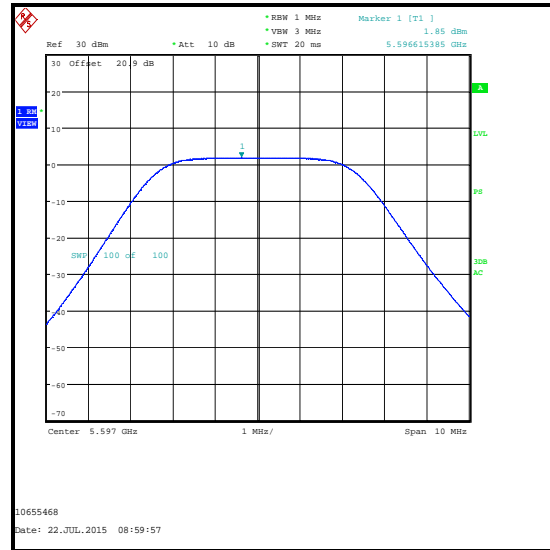
Results: Omnidirectional Antenna / 5 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-5.9	-6.3	-3.1	4.9	8.0	Complied
Middle	1.9	1.1	4.5	4.9	0.4	Complied
Top	-7.2	-8.7	-4.9	4.9	9.8	Complied

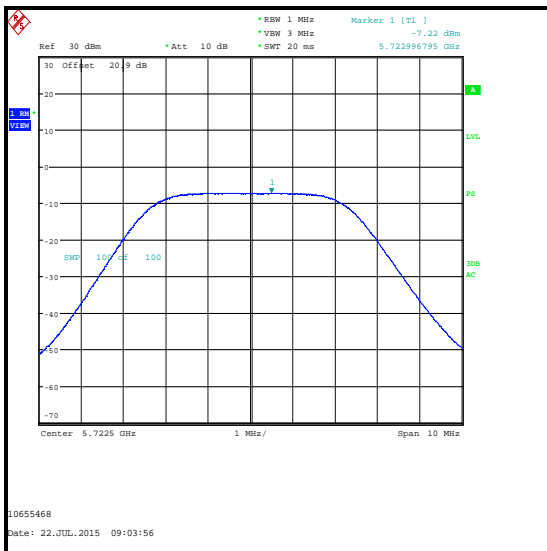
A Port



Bottom Channel



Middle Channel

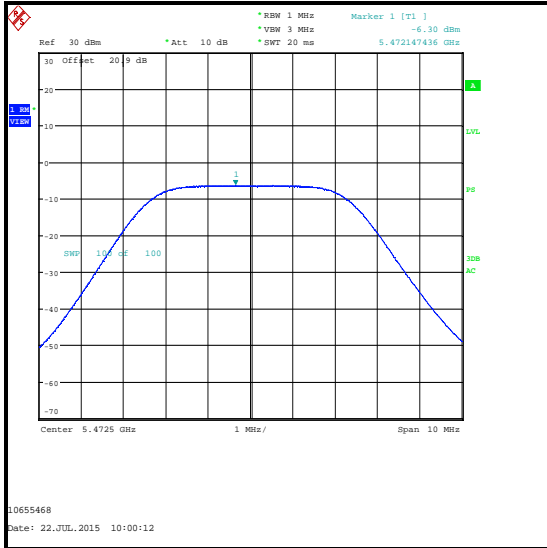


Top Channel

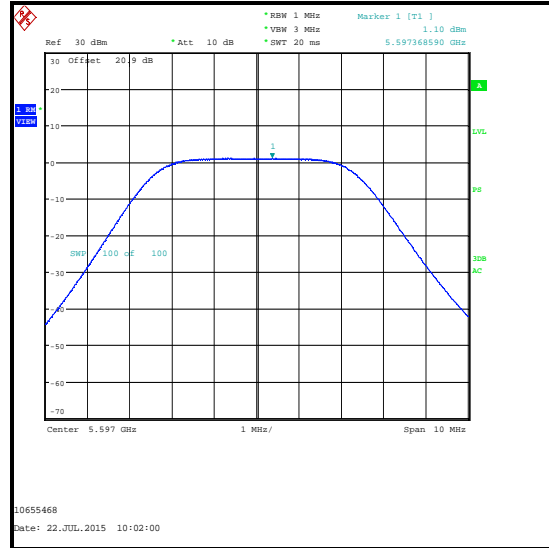
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 5 MHz Channel / QPSK

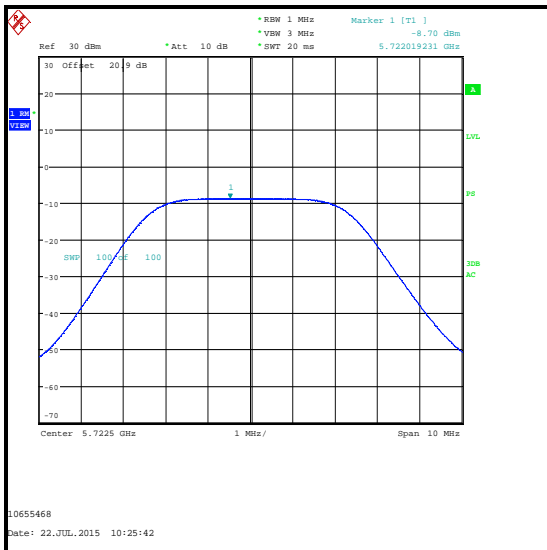
B Port



Bottom Channel



Middle Channel



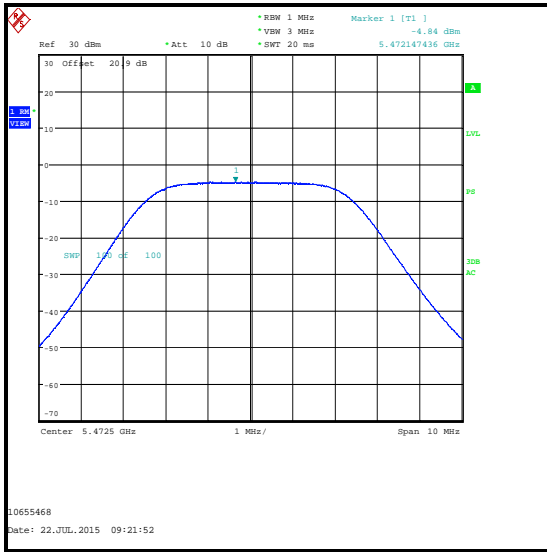
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

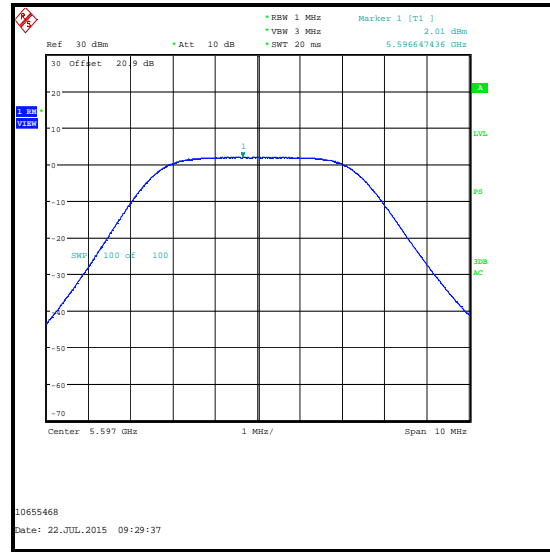
Results: Omnidirectional Antenna / 5 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-4.8	-6.0	-2.3	4.9	7.2	Complied
Middle	2.0	1.4	4.7	4.9	0.2	Complied
Top	-5.0	-5.9	-2.4	4.9	7.3	Complied

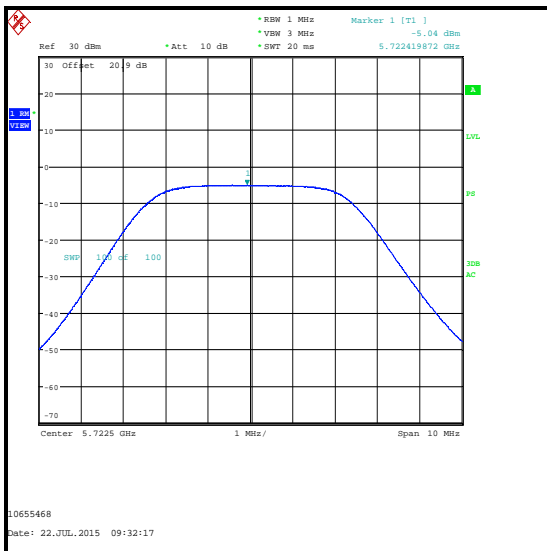
A Port



Bottom Channel



Middle Channel

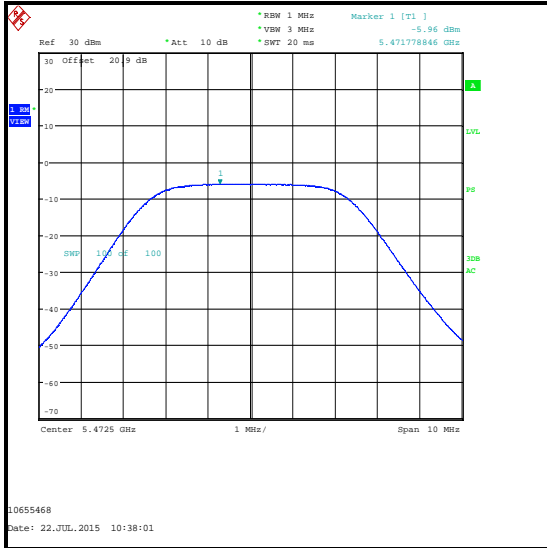


Top Channel

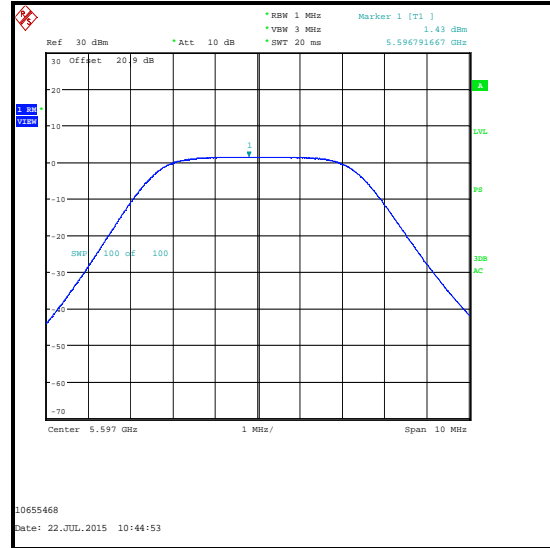
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 5 MHz Channel / 256QAM

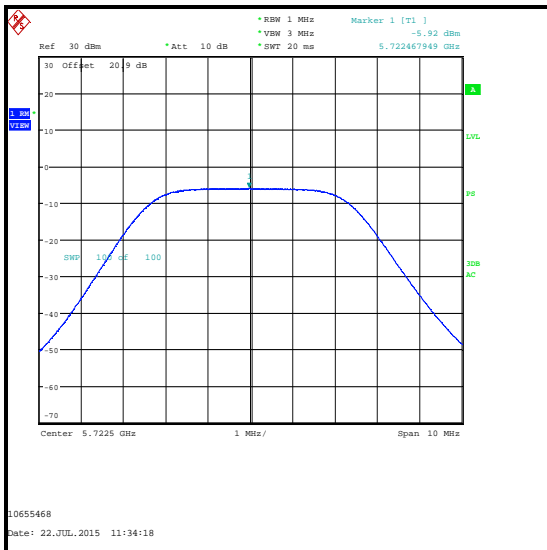
B Port



Bottom Channel



Middle Channel



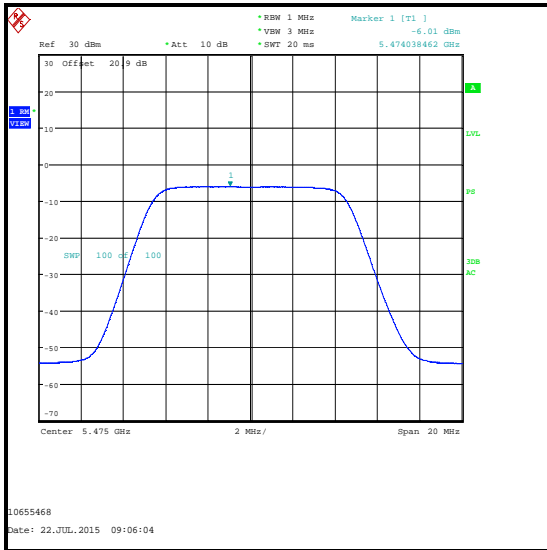
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

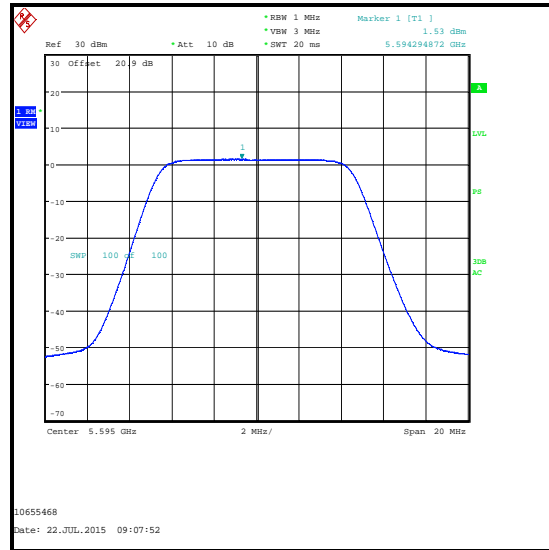
Results: Omnidirectional Antenna / 10 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-6.0	-6.4	-3.2	4.9	8.1	Complied
Middle	1.5	1.0	4.3	4.9	0.6	Complied
Top	-5.7	-6.0	-2.8	4.9	7.7	Complied

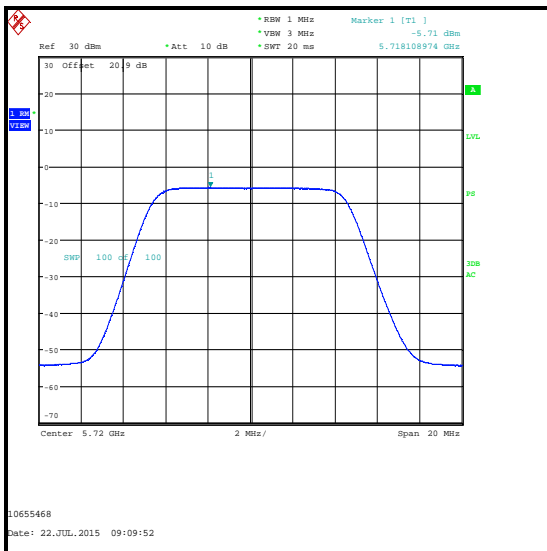
A Port



Bottom Channel



Middle Channel

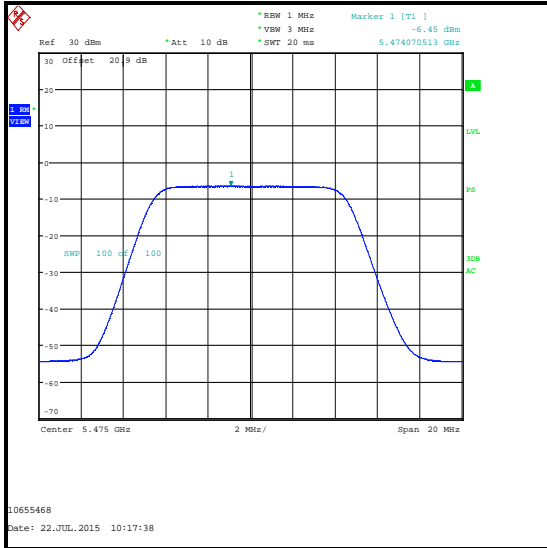


Top Channel

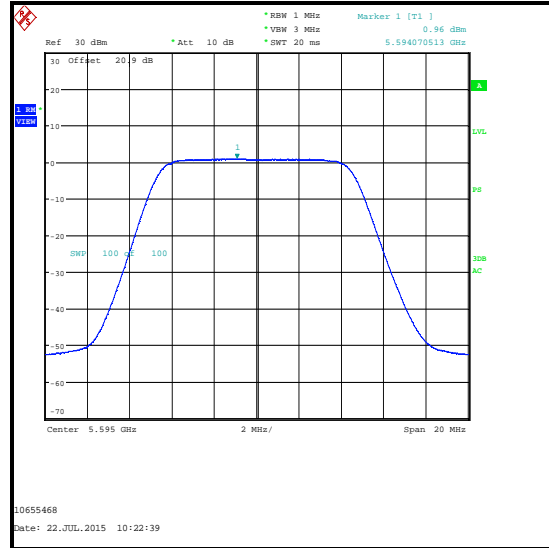
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 10 MHz Channel / QPSK

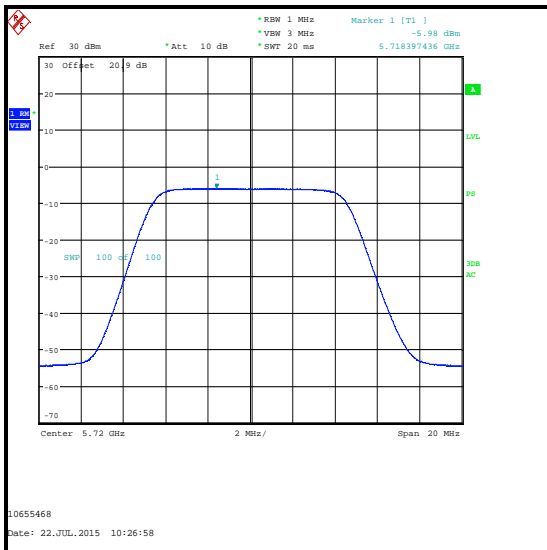
B Port



Bottom Channel



Middle Channel



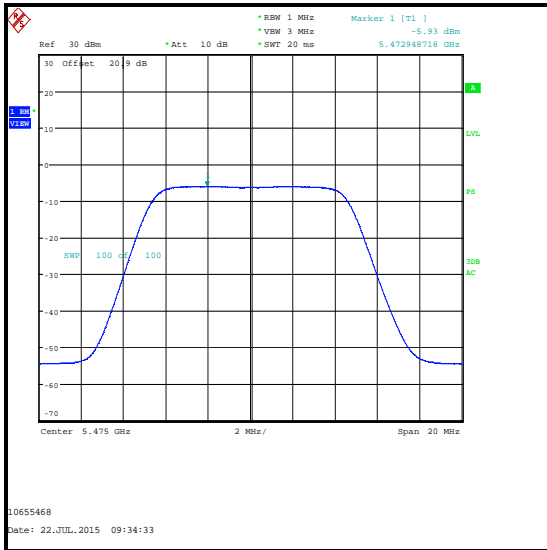
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

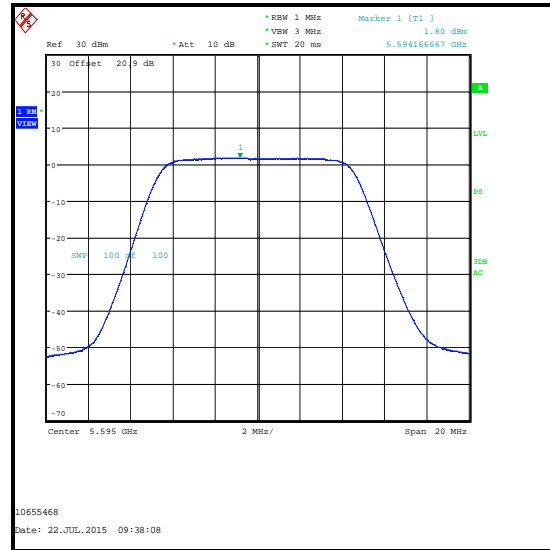
Results: Omnidirectional Antenna / 10 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-5.9	-6.1	-3.0	4.9	7.9	Complied
Middle	1.8	1.2	4.5	4.9	0.4	Complied
Top	-5.5	-5.8	-2.6	4.9	7.5	Complied

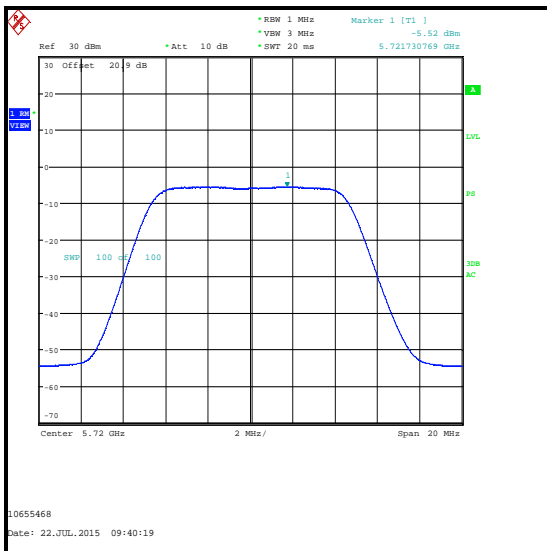
A Port



Bottom Channel



Middle Channel

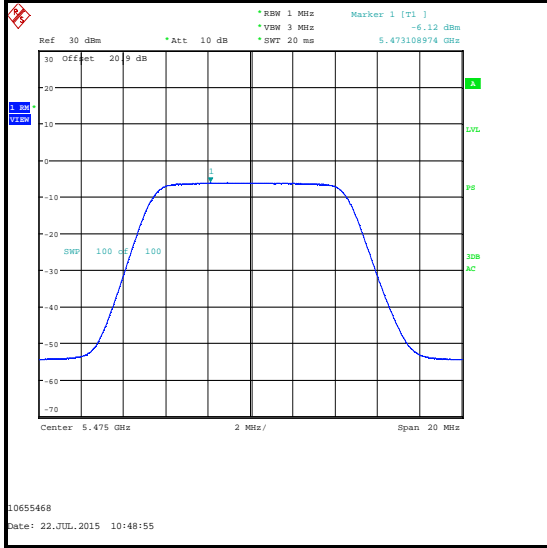


Top Channel

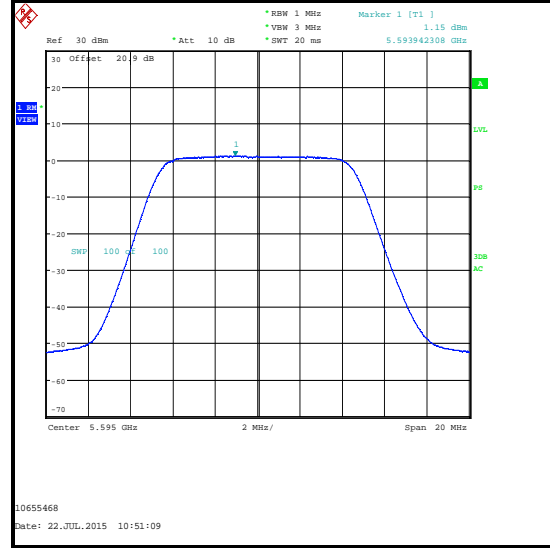
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 10 MHz Channel / 256QAM

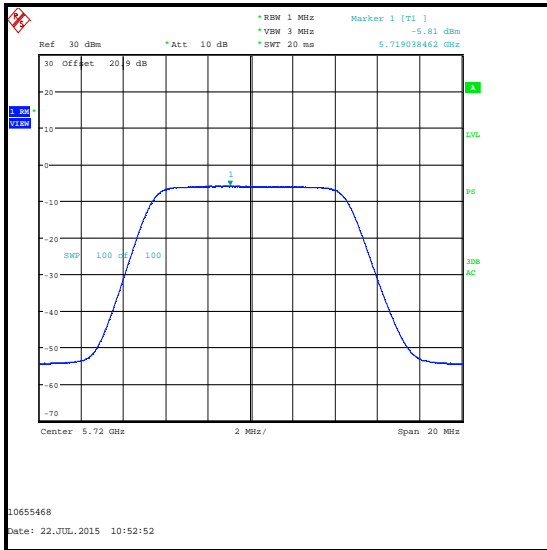
B Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-6.3	-6.9	-3.6	4.9	8.5	Complied
Middle	1.6	0.9	4.3	4.9	0.6	Complied
Top	-5.8	-6.5	-3.1	4.9	8.0	Complied

A Port



Bottom Channel



Middle Channel

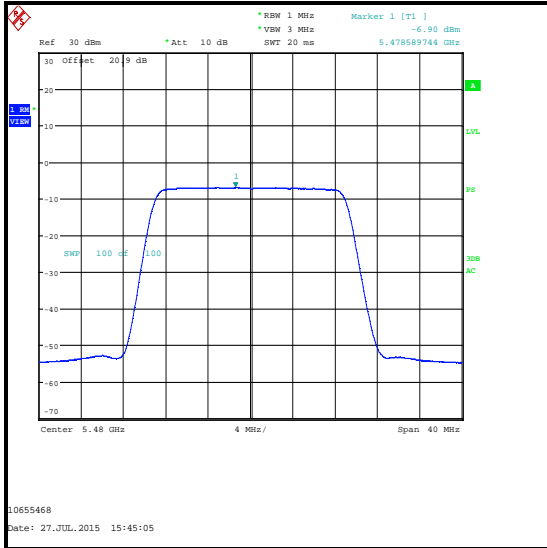


Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / QPSK

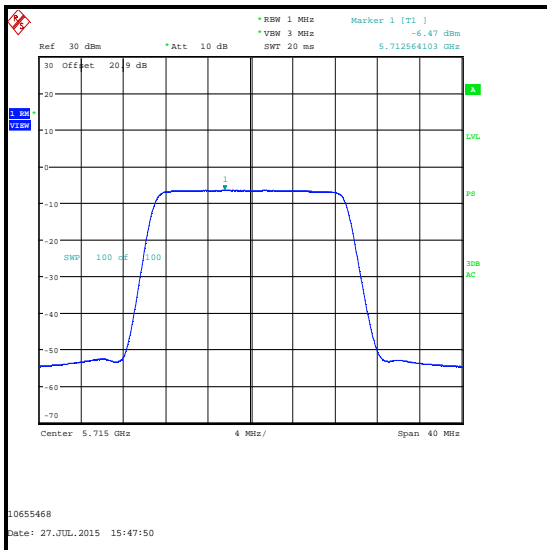
B Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-6.2	-6.6	-3.4	4.9	8.3	Complied
Middle	1.9	1.0	4.5	4.9	0.4	Complied
Top	-5.8	-6.5	-3.1	4.9	8.0	Complied

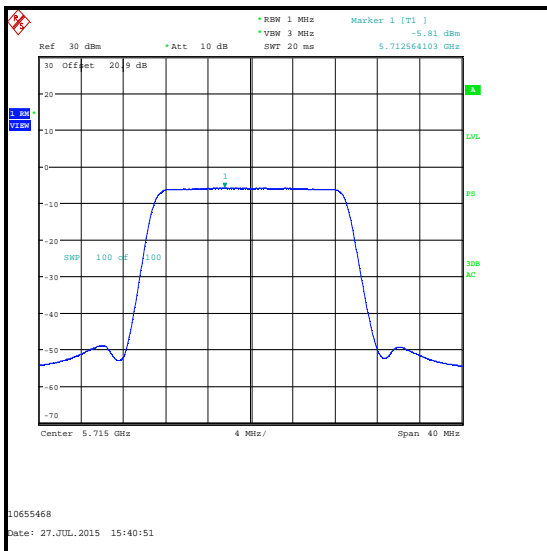
A Port



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Omnidirectional Antenna / 20 MHz Channel / 256QAM

B Port



Bottom Channel



Middle Channel



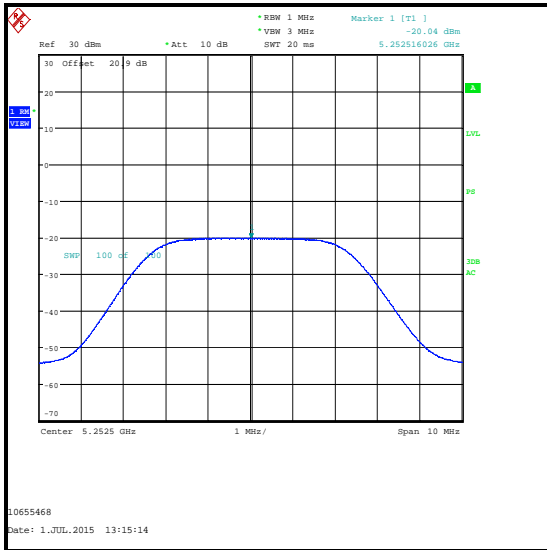
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

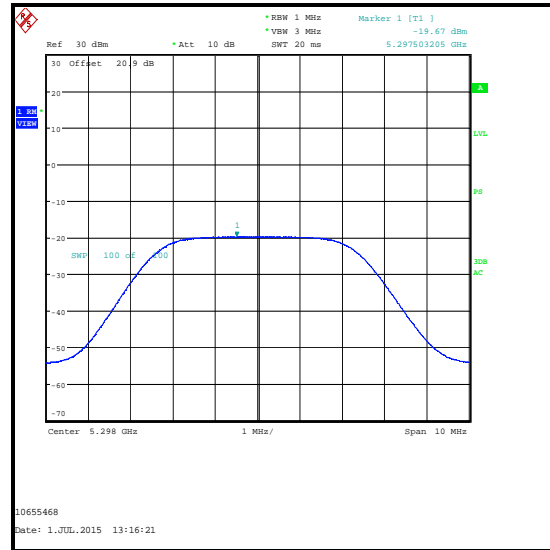
Results: 4' Parabolic Antenna / 5 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-20.0	-20.5	-17.2	-16.6	0.6	Complied
Middle	-19.7	-20.8	-17.2	-16.6	0.6	Complied
Top	-19.6	-20.0	-16.8	-16.6	0.2	Complied

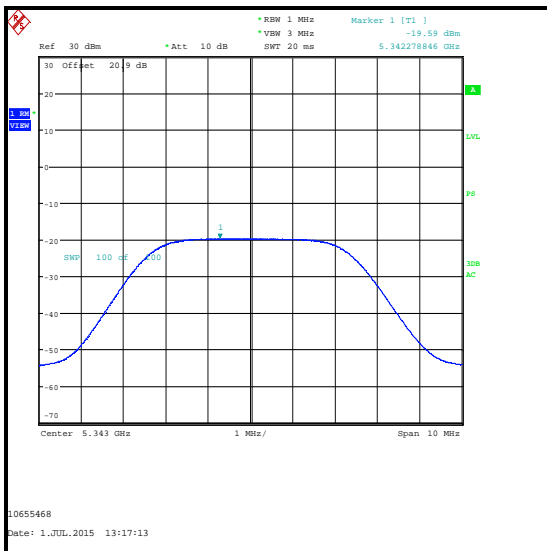
A Port



Bottom Channel



Middle Channel

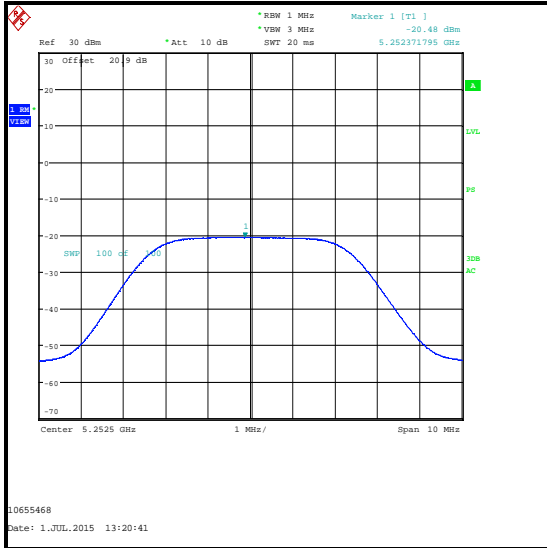


Top Channel

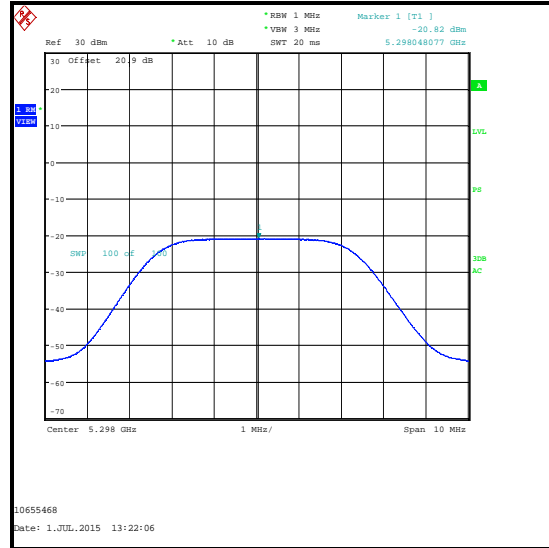
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: 4' Parabolic Antenna / 5 MHz Channel / QPSK

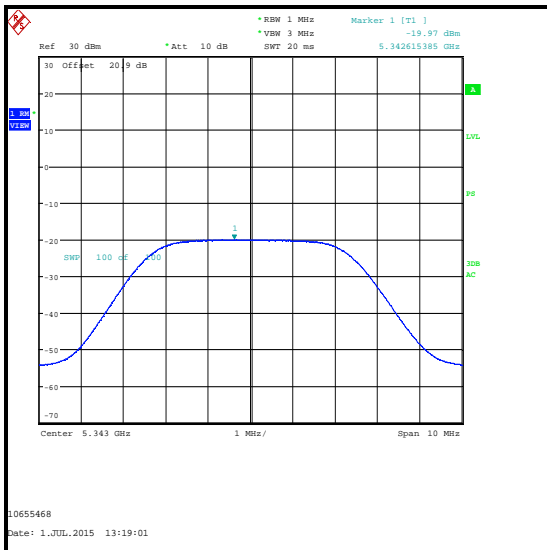
B Port



Bottom Channel



Middle Channel



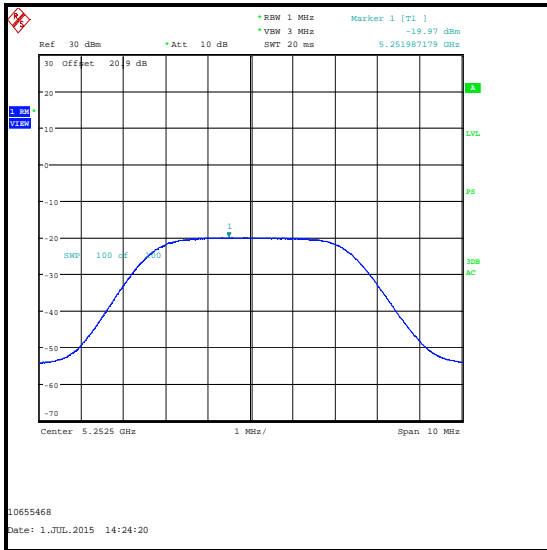
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

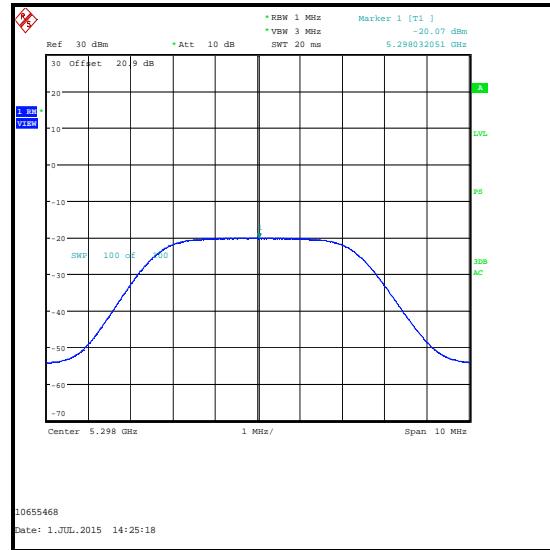
Results: 4' Parabolic Antenna / 5 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-20.0	-20.4	-17.2	-16.6	0.6	Complied
Middle	-20.1	-20.7	-17.4	-16.6	0.8	Complied
Top	-19.7	-20.1	-16.9	-16.6	0.3	Complied

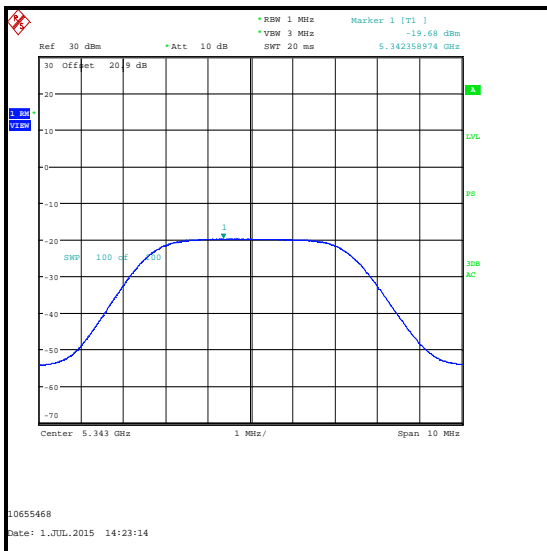
A Port



Bottom Channel



Middle Channel

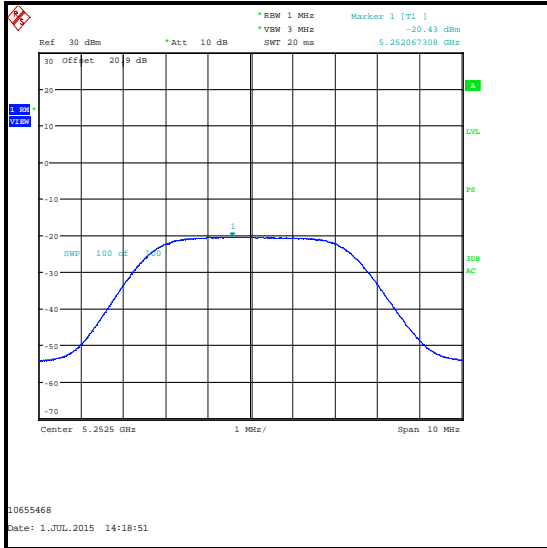


Top Channel

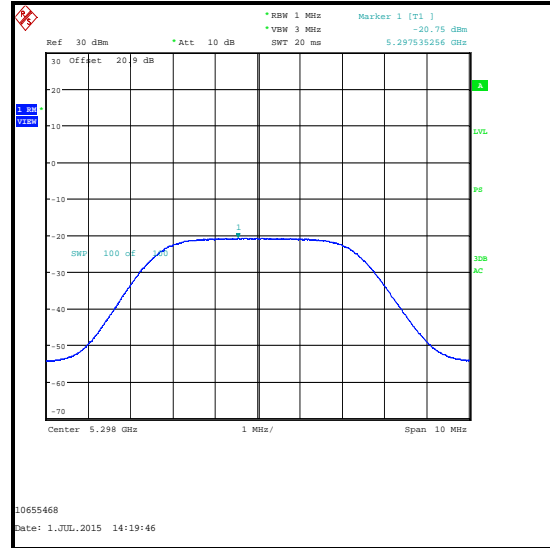
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: 4' Parabolic Antenna / 5 MHz Channel / 256QAM

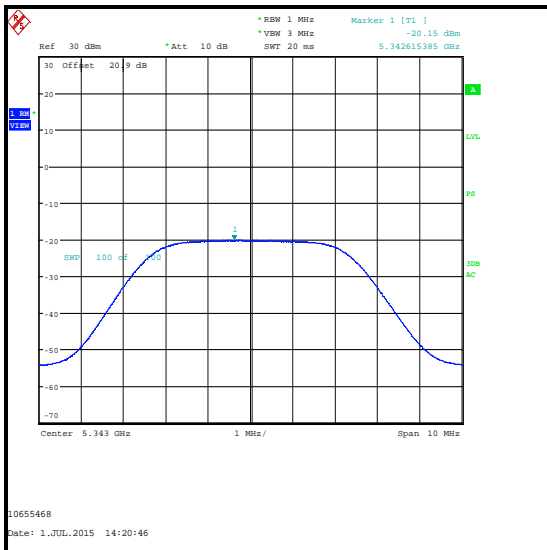
B Port



Bottom Channel



Middle Channel



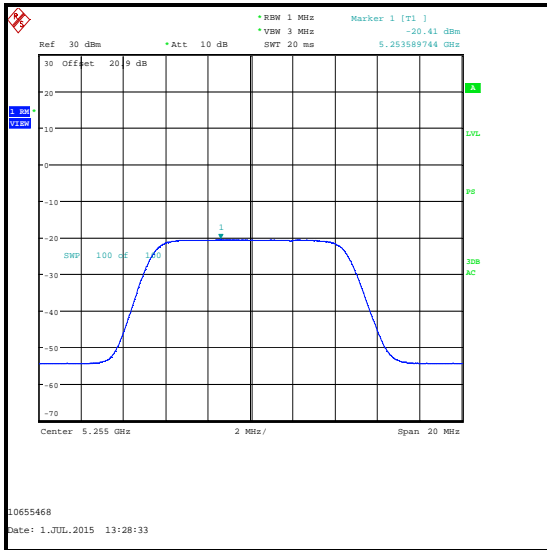
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

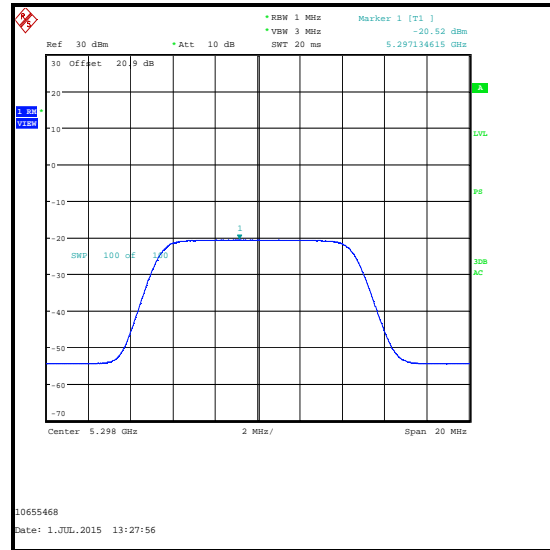
Results: 4' Parabolic Antenna / 10 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-20.4	-20.9	-17.6	-16.6	1.0	Complied
Middle	-20.5	-20.8	-17.6	-16.6	1.0	Complied
Top	-19.7	-20.4	-17.0	-16.6	0.4	Complied

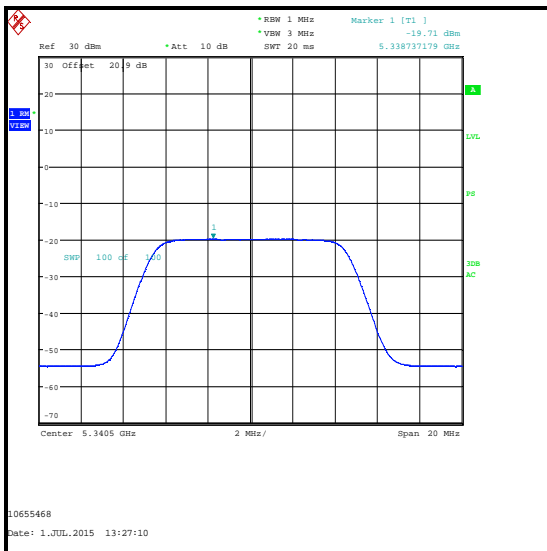
A Port



Bottom Channel



Middle Channel

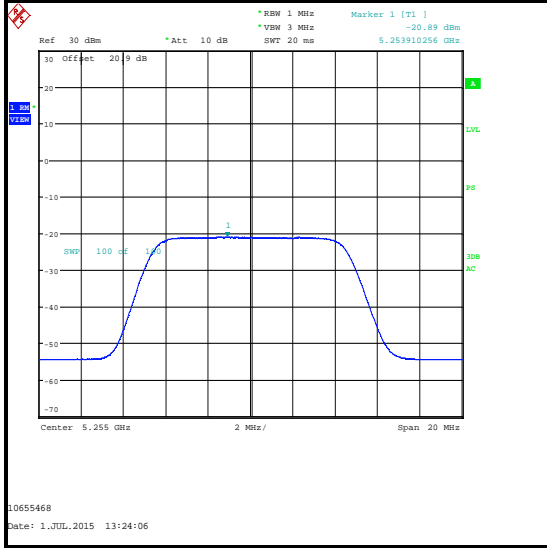


Top Channel

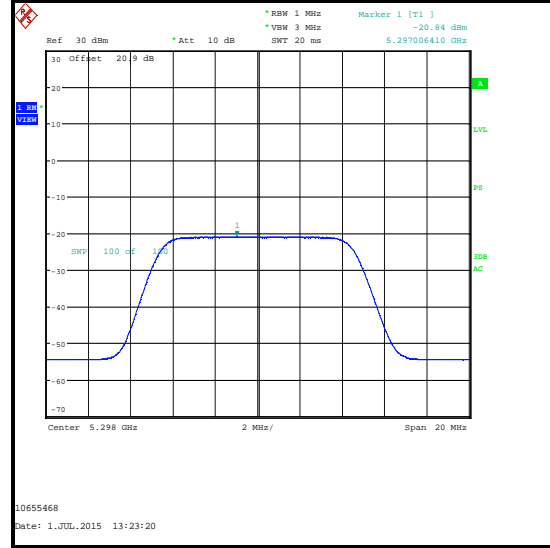
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: 4' Parabolic Antenna / 10 MHz Channel / QPSK

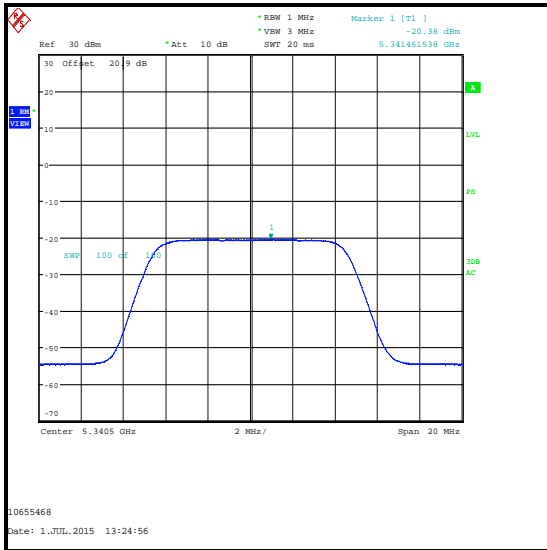
B Port



Bottom Channel



Middle Channel



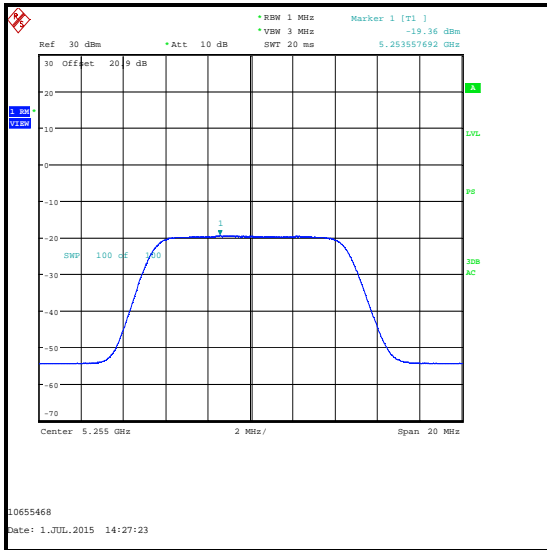
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

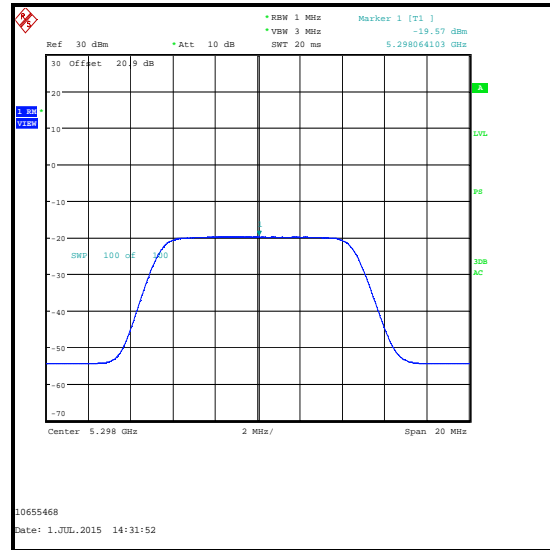
Results: 4' Parabolic Antenna / 10 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-19.4	-20.9	-17.1	-16.6	0.5	-17.1
Middle	-19.6	-20.9	-17.2	-16.6	0.6	-17.2
Top	-19.5	-20.9	-17.1	-16.6	0.5	-17.1

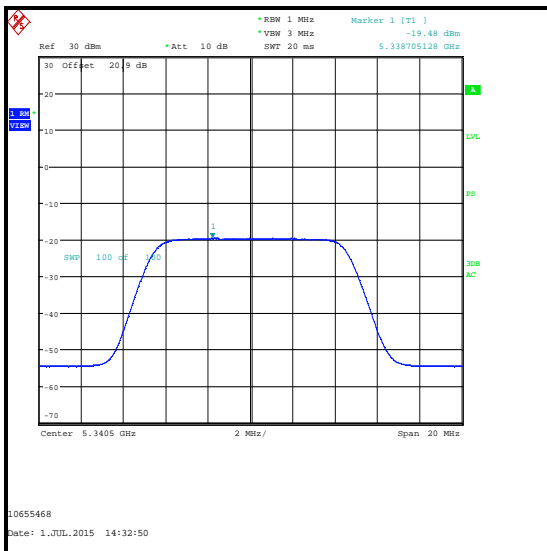
A Port



Bottom Channel



Middle Channel

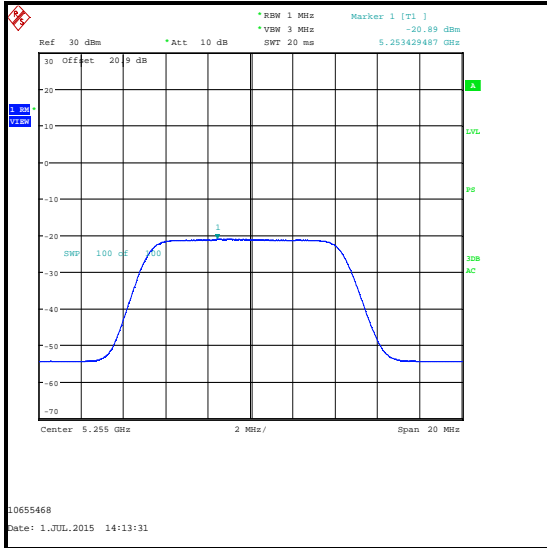


Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: 4' Parabolic Antenna / 10 MHz Channel / 256QAM

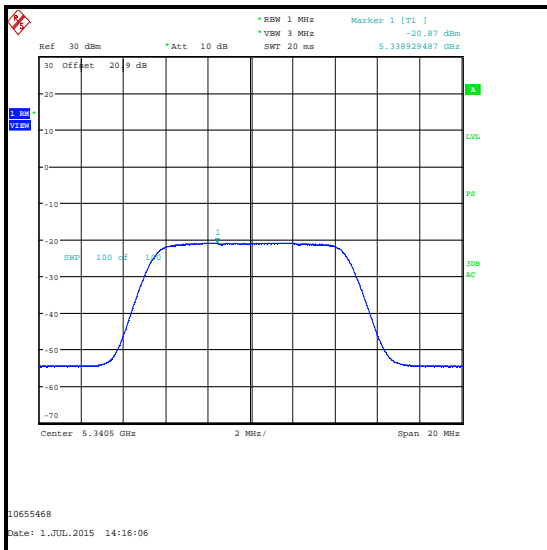
B Port



Bottom Channel



Middle Channel



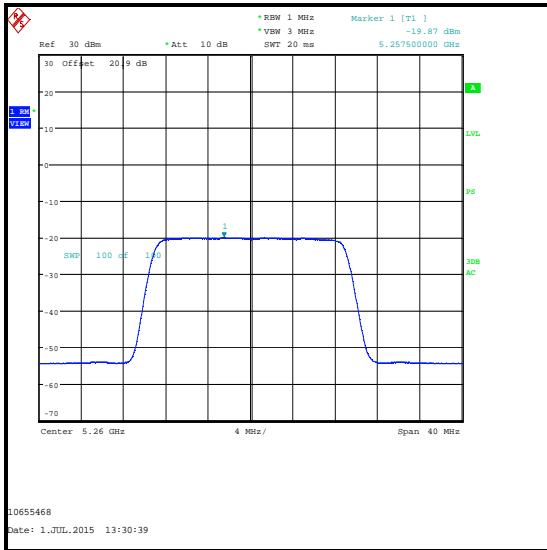
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

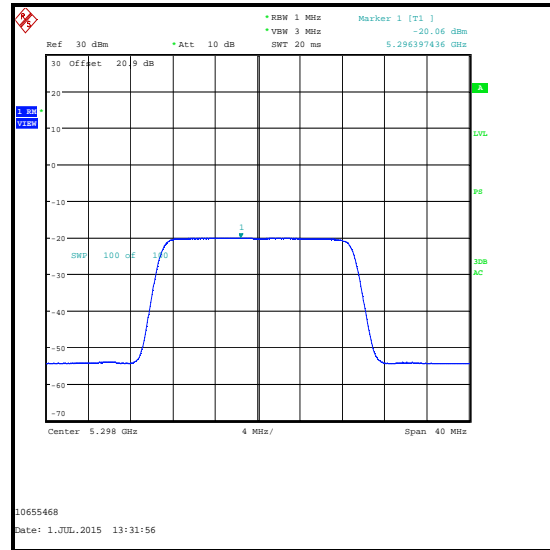
Results: 4' Parabolic Antenna / 20 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-19.9	-20.4	-17.1	-16.6	0.5	Complied
Middle	-20.1	-20.8	-17.4	-16.6	0.8	Complied
Top	-19.5	-20.7	-17.0	-16.6	0.4	Complied

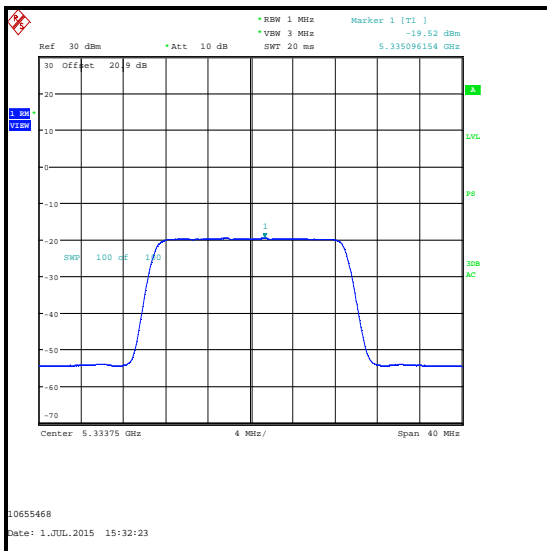
A Port



Bottom Channel



Middle Channel

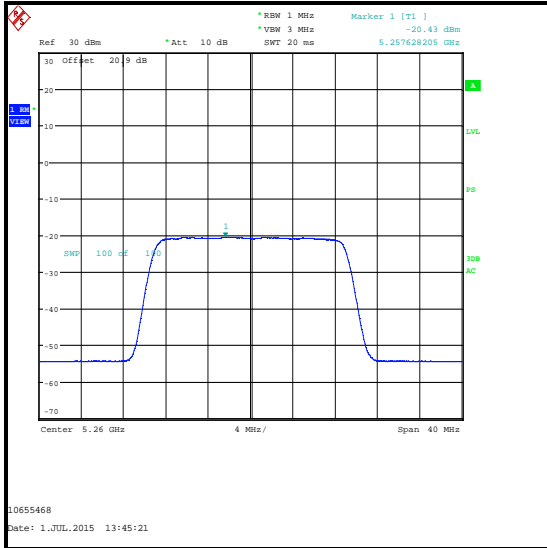


Top Channel

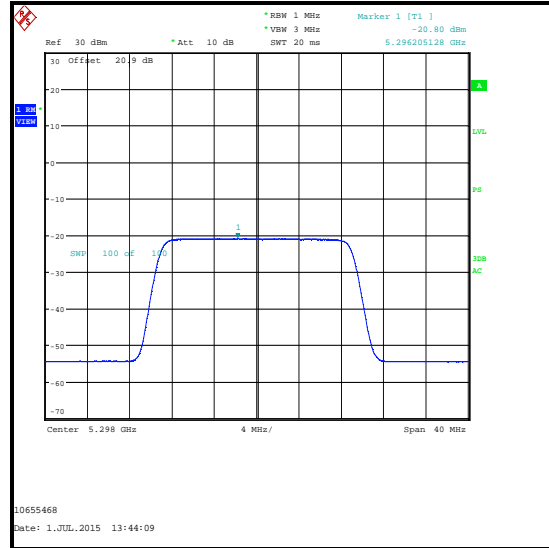
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: 4' Parabolic Antenna / 20 MHz Channel / QPSK

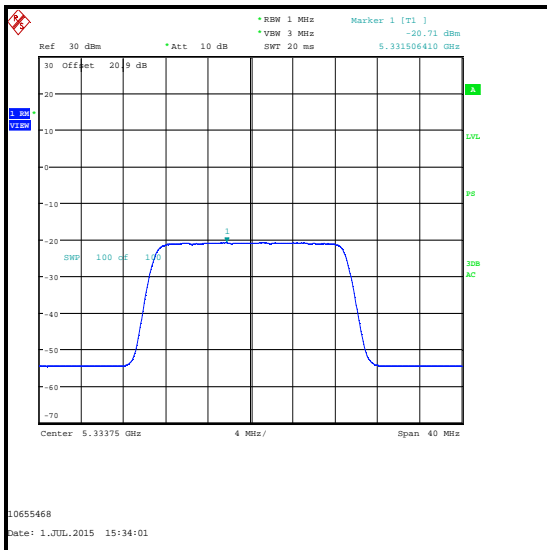
B Port



Bottom Channel



Middle Channel



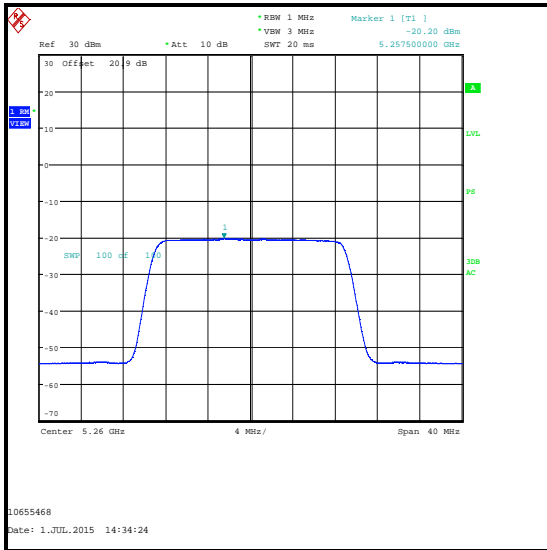
Top Channel

Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

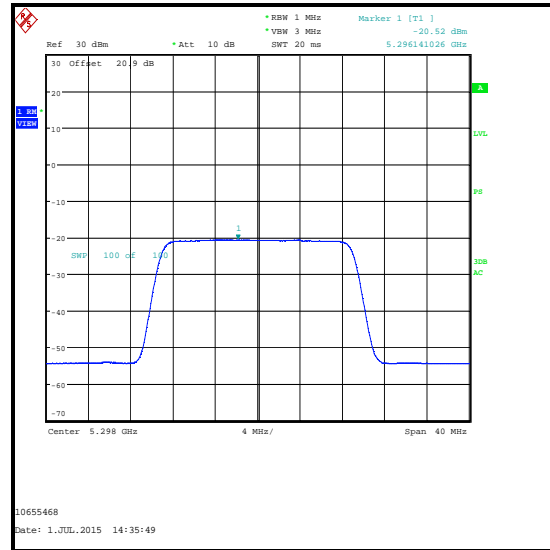
Results: 4' Parabolic Antenna / 20 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-20.2	-20.8	-17.5	-16.6	0.9	Complied
Middle	-20.5	-21.1	-17.8	-16.6	1.2	Complied
Top	-19.1	-20.4	-16.7	-16.6	0.1	Complied

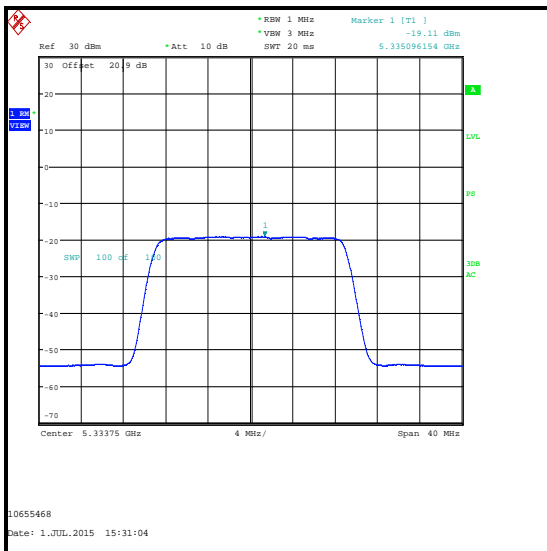
A Port



Bottom Channel



Middle Channel

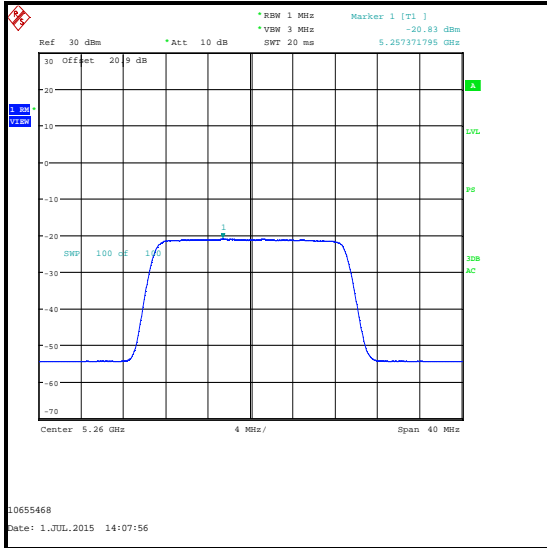


Top Channel

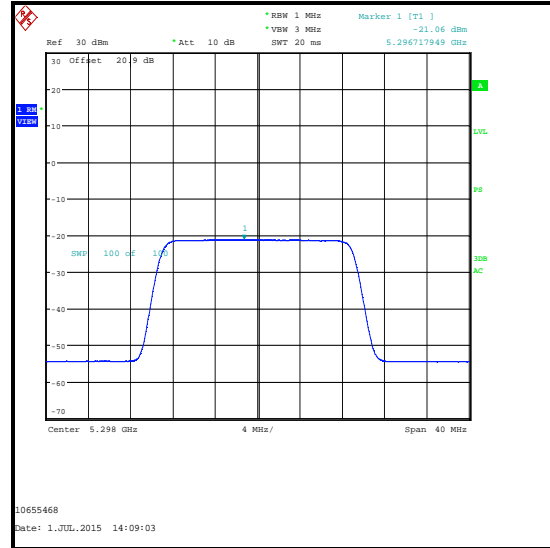
Transmitter Maximum Power Spectral Density (5.25-5.35 GHz Band) (continued)

Results: 4' Parabolic Antenna / 20 MHz Channel / 256QAM

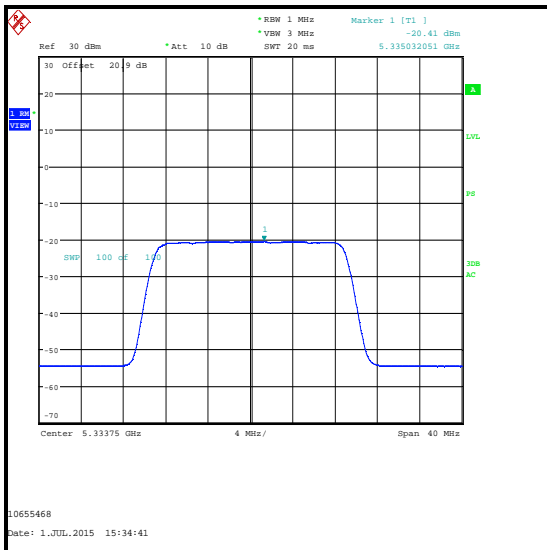
B Port



Bottom Channel



Middle Channel



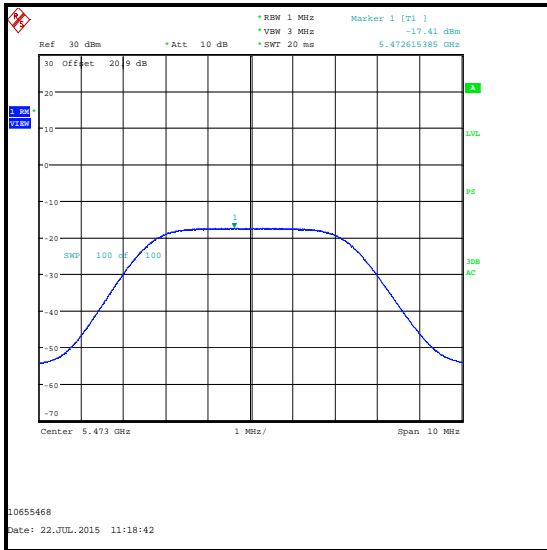
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

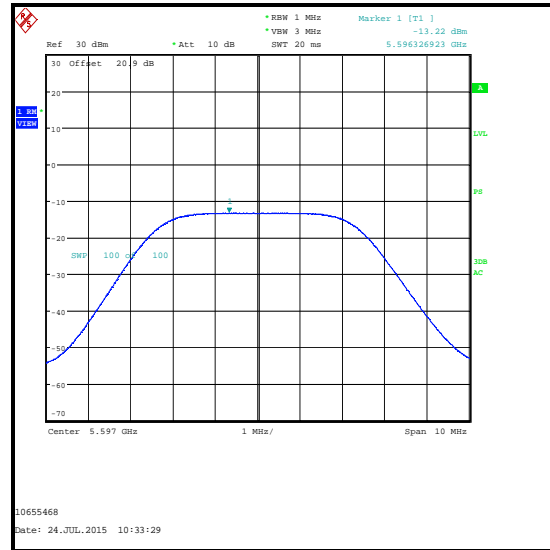
Results: Plate Antenna / 5 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-17.4	-18.6	-14.9	-10.6	4.3	Complied
Middle	-13.2	-14.4	-10.7	-10.6	0.1	Complied
Top	-18.1	-19.4	-15.7	-10.6	5.1	Complied

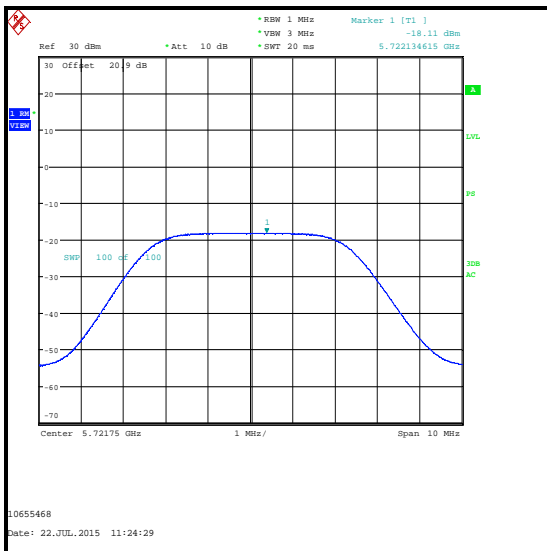
A Port



Bottom Channel



Middle Channel

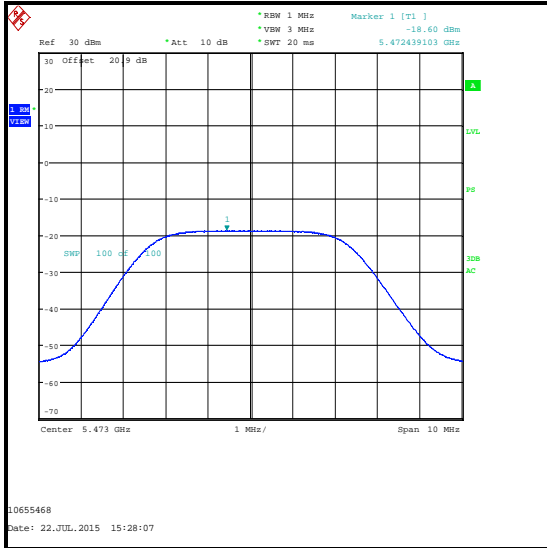


Top Channel

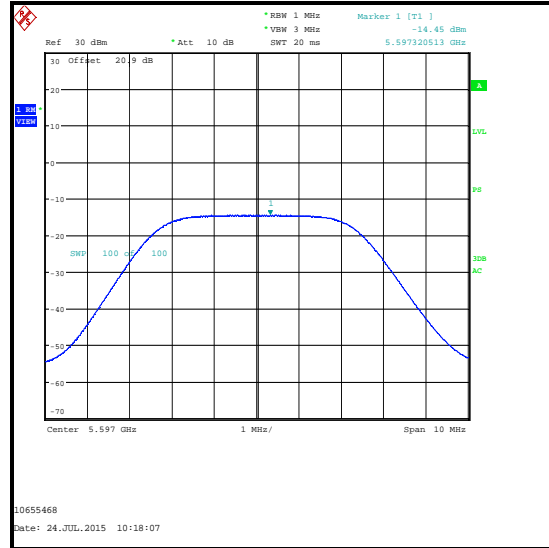
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 5 MHz Channel / QPSK

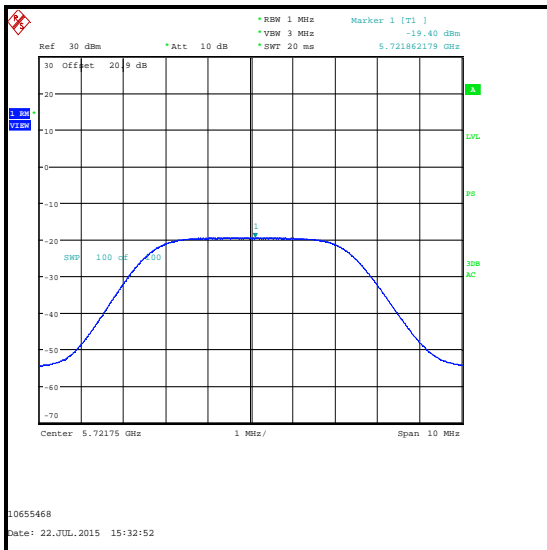
B Port



Bottom Channel



Middle Channel



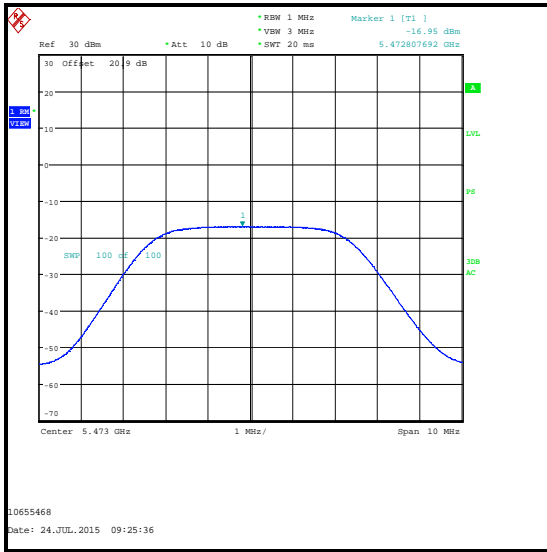
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

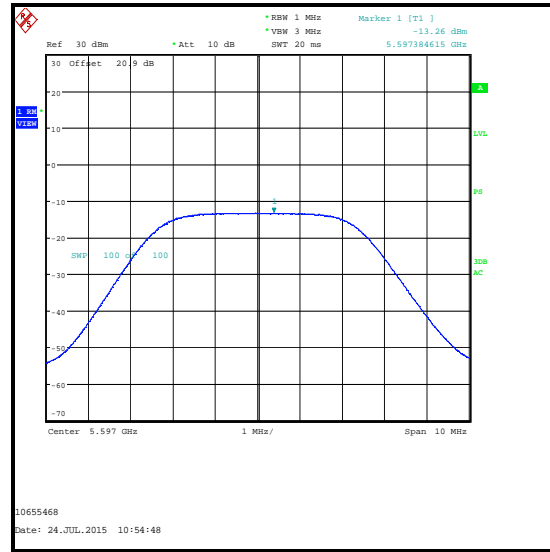
Results: Plate Antenna / 5 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-16.9	-18.3	-14.5	-10.6	3.9	Complied
Middle	-13.3	-14.8	-11.0	-10.6	0.4	Complied
Top	-17.2	-19.6	-15.2	-10.6	4.6	Complied

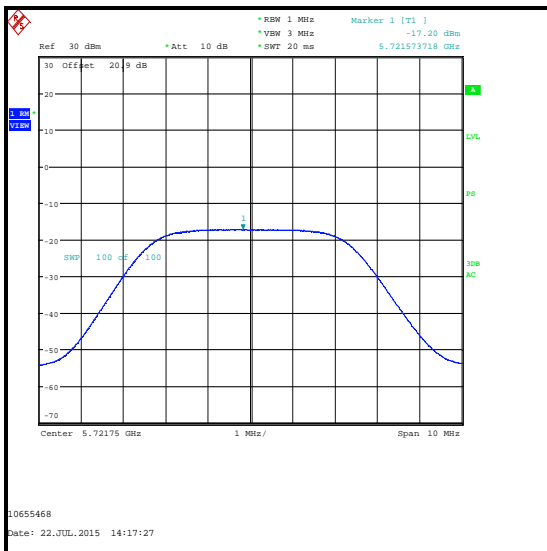
A Port



Bottom Channel



Middle Channel

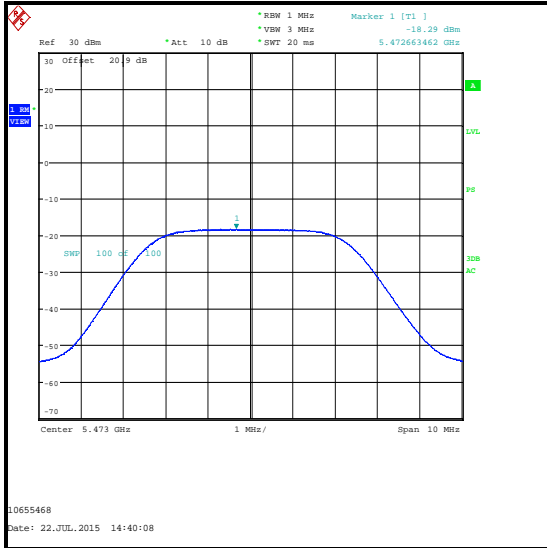


Top Channel

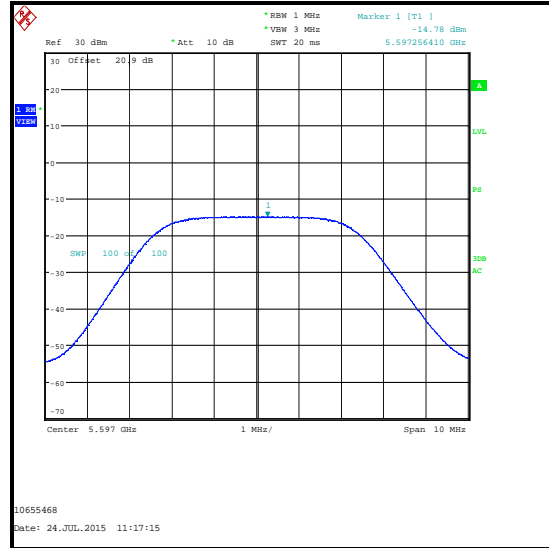
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 5 MHz Channel / 256QAM

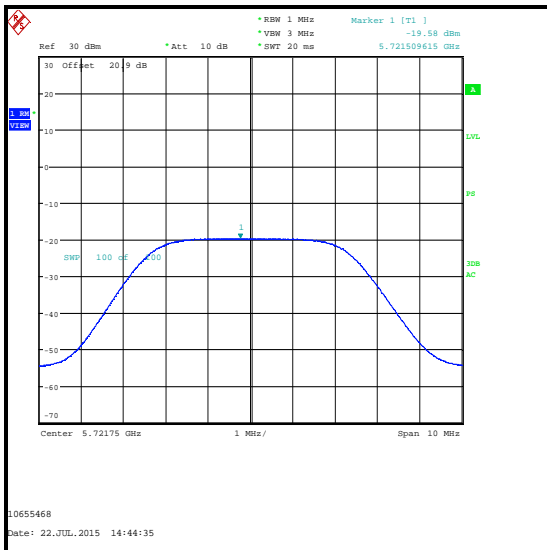
B Port



Bottom Channel



Middle Channel



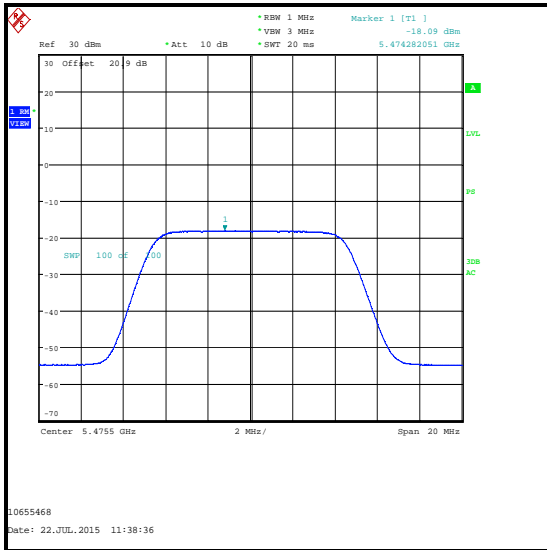
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

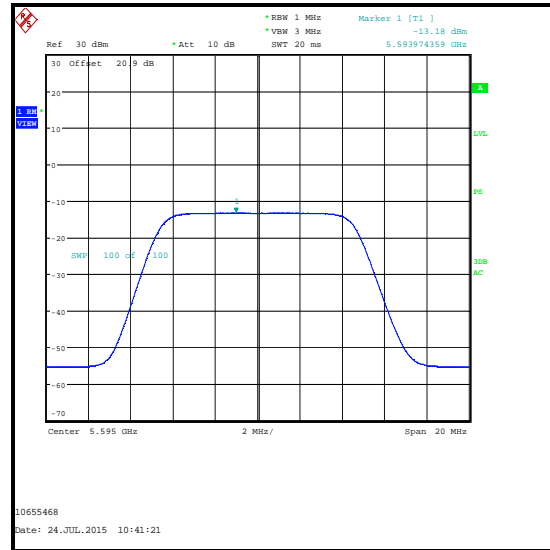
Results: Plate Antenna / 10 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-18.1	-19.4	-15.7	-10.6	5.1	Complied
Middle	-13.2	-14.9	-11.0	-10.6	0.4	Complied
Top	-17.0	-19.7	-15.1	-10.6	4.5	Complied

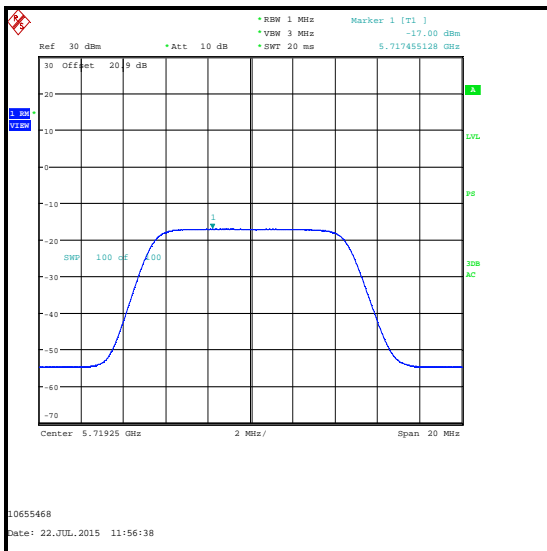
A Port



Bottom Channel



Middle Channel

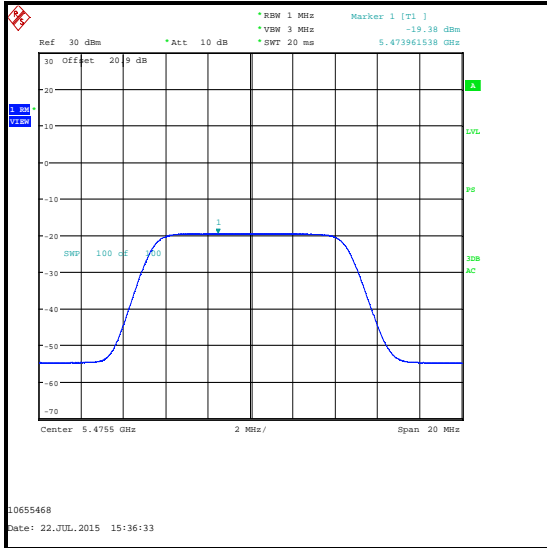


Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 10 MHz Channel / QPSK

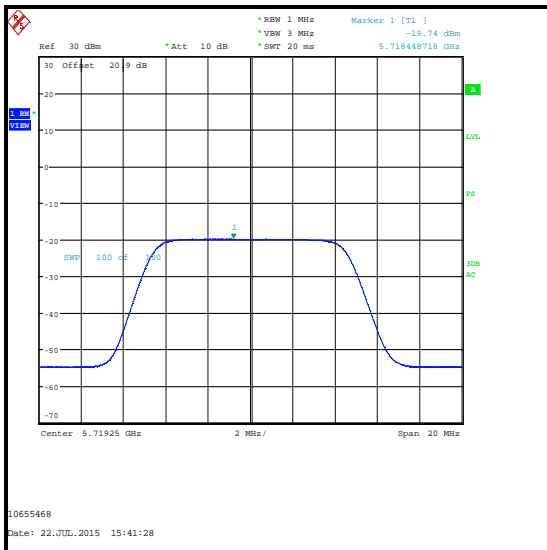
B Port



Bottom Channel



Middle Channel



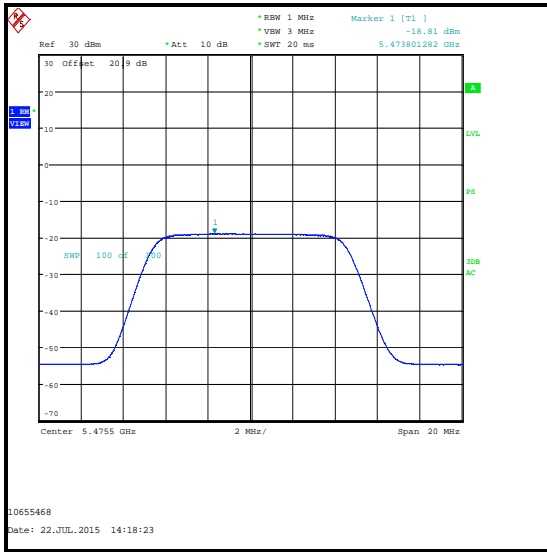
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

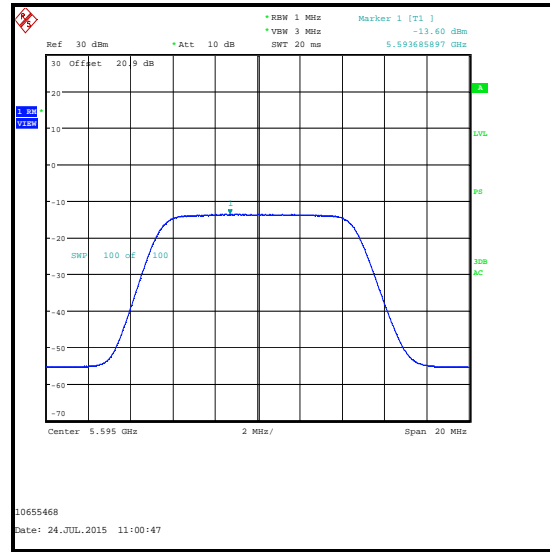
Results: Plate Antenna / 10 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-18.8	-20.6	-16.6	-10.6	6.0	Complied
Middle	-13.6	-15.0	-11.2	-10.6	0.6	Complied
Top	-18.8	-20.8	-16.7	-10.6	6.1	Complied

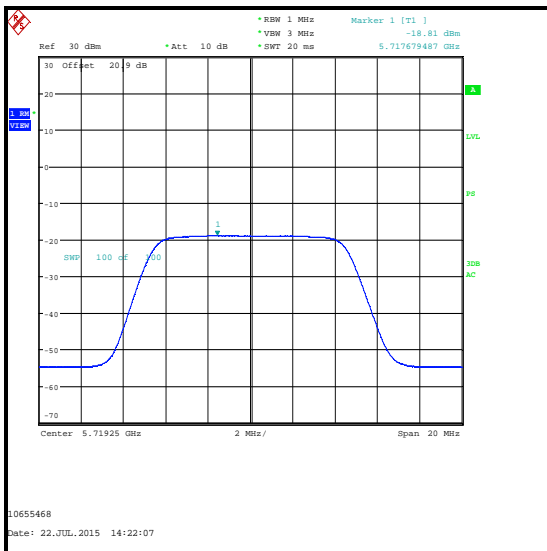
A Port



Bottom Channel



Middle Channel

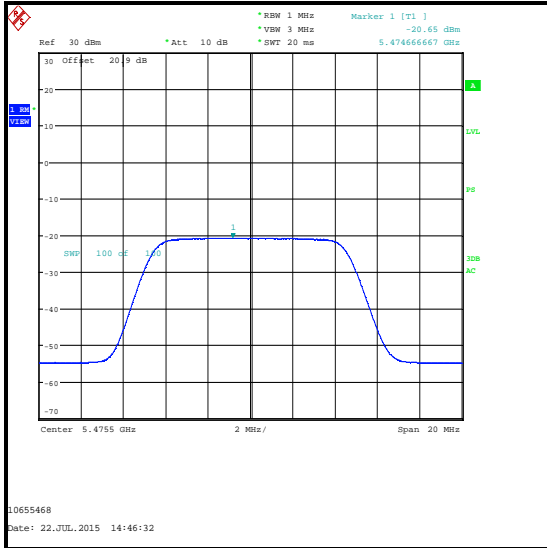


Top Channel

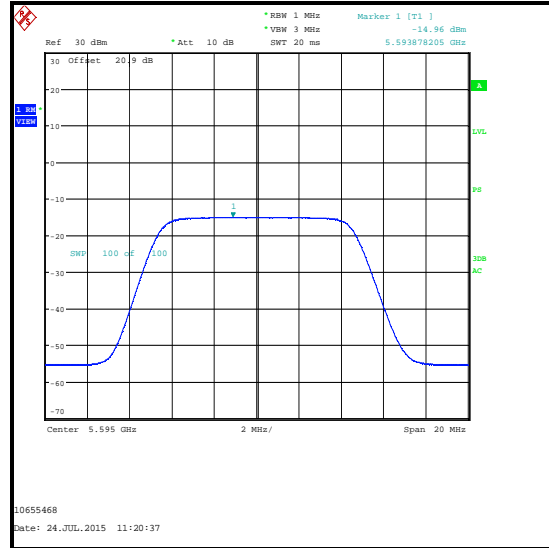
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 10 MHz Channel / 256QAM

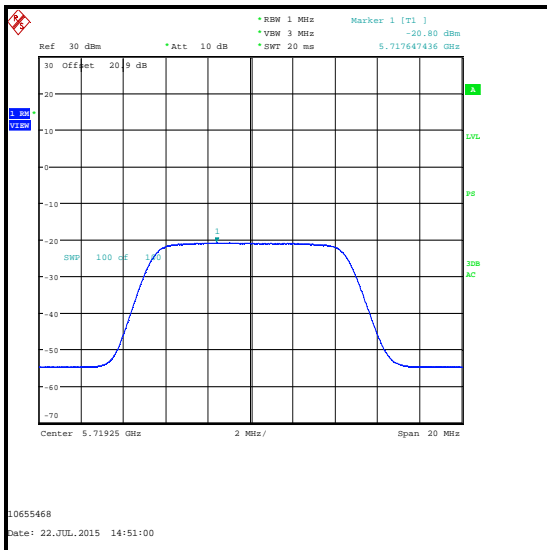
B Port



Bottom Channel



Middle Channel



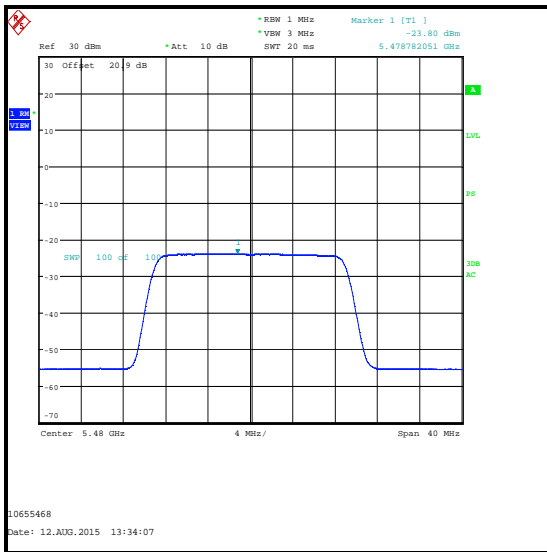
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 20 MHz Channel / QPSK

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-23.8	-26.5	-21.9	-10.6	11.3	Complied
Middle	-13.7	-15.0	-11.3	-10.6	0.7	Complied
Top	-24.3	-26.1	-22.1	-10.6	11.5	Complied

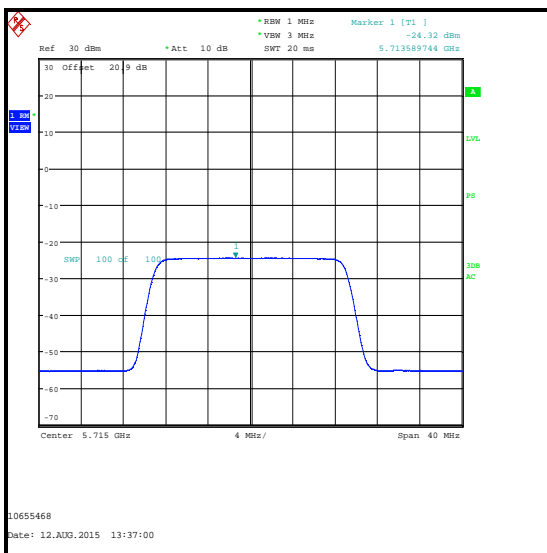
A Port



Bottom Channel



Middle Channel

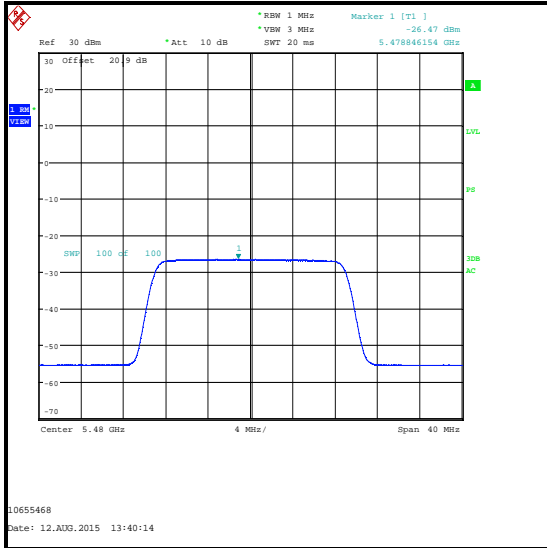


Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 20 MHz Channel / QPSK

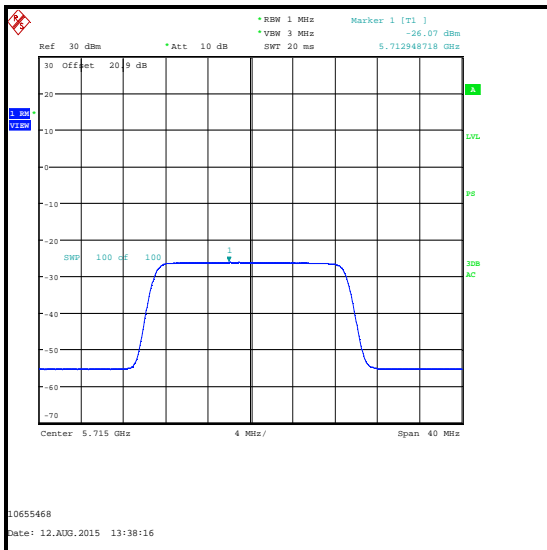
B Port



Bottom Channel



Middle Channel



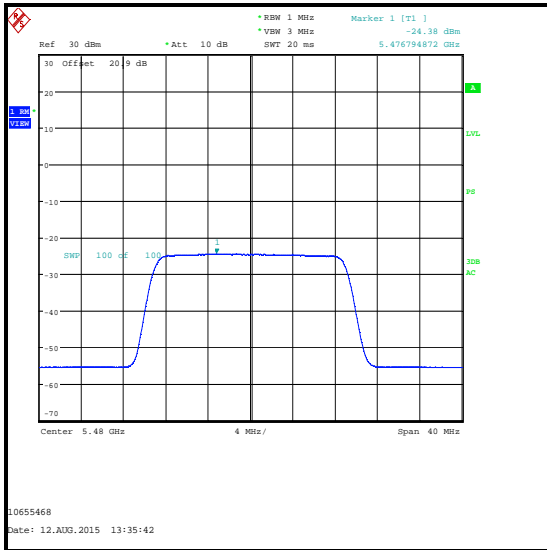
Top Channel

Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

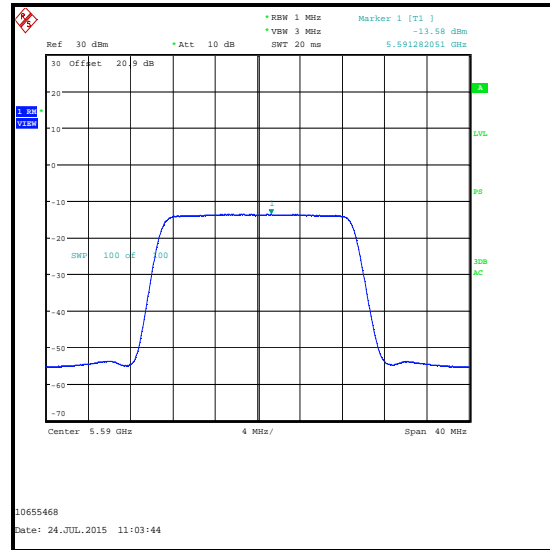
Results: Plate Antenna / 20 MHz Channel / 256QAM

Channel	PSD A Port (dBm/MHz)	PSD B Port (dBm/MHz)	PSD Power (dBm/MHz)	PSD Power Limit (dBm/MHz)	Margin (dB)	Result
Bottom	-24.4	-26.3	-22.2	-10.6	11.6	Complied
Middle	-13.6	-15.1	-11.3	-10.6	0.7	Complied
Top	-24.2	-26.2	-22.1	-10.6	11.5	Complied

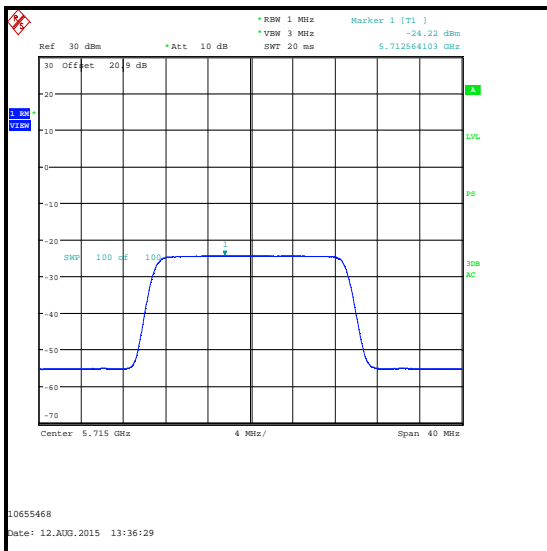
A Port



Bottom Channel



Middle Channel



Top Channel

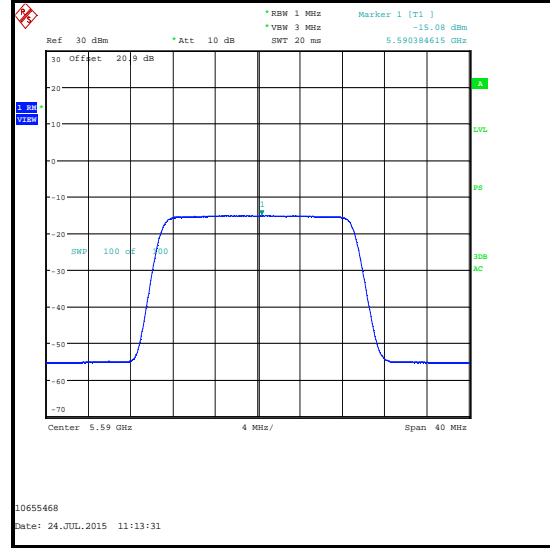
Transmitter Maximum Power Spectral Density (5.47-5.725 GHz Band) (continued)

Results: Plate Antenna / 20 MHz Channel / 256QAM

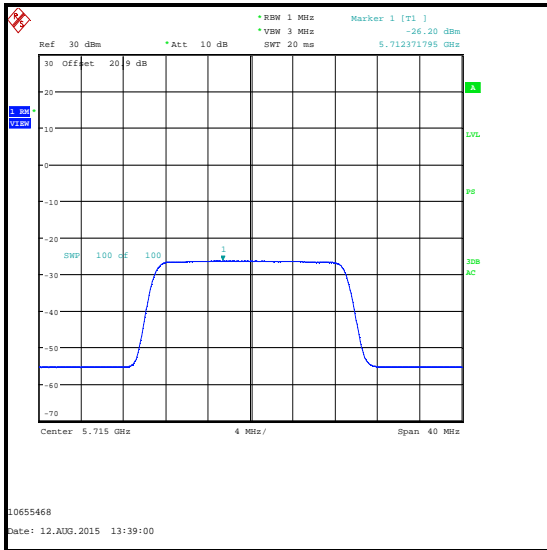
B Port



Bottom Channel



Middle Channel



Top Channel

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	Calibrated Before Use	N/A
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	20 Feb 2016	12
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	24 Oct 2015	24
M1785	Thermohyrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12

5.2.5. Transmitter Out of Band Radiated Emissions**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Dates:	04 July 2015 to 23 July 2015
Test Sample Serial Number:	F50980BB016F		

FCC Reference:	Parts 15.407(b)(2), 15.407(b)(3) & 15.209(a)
Test Method Used:	FCC KDB 789033 II.G.4 & ANSI C63.10 Sections 6.3 & 6.5 and Notes below
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

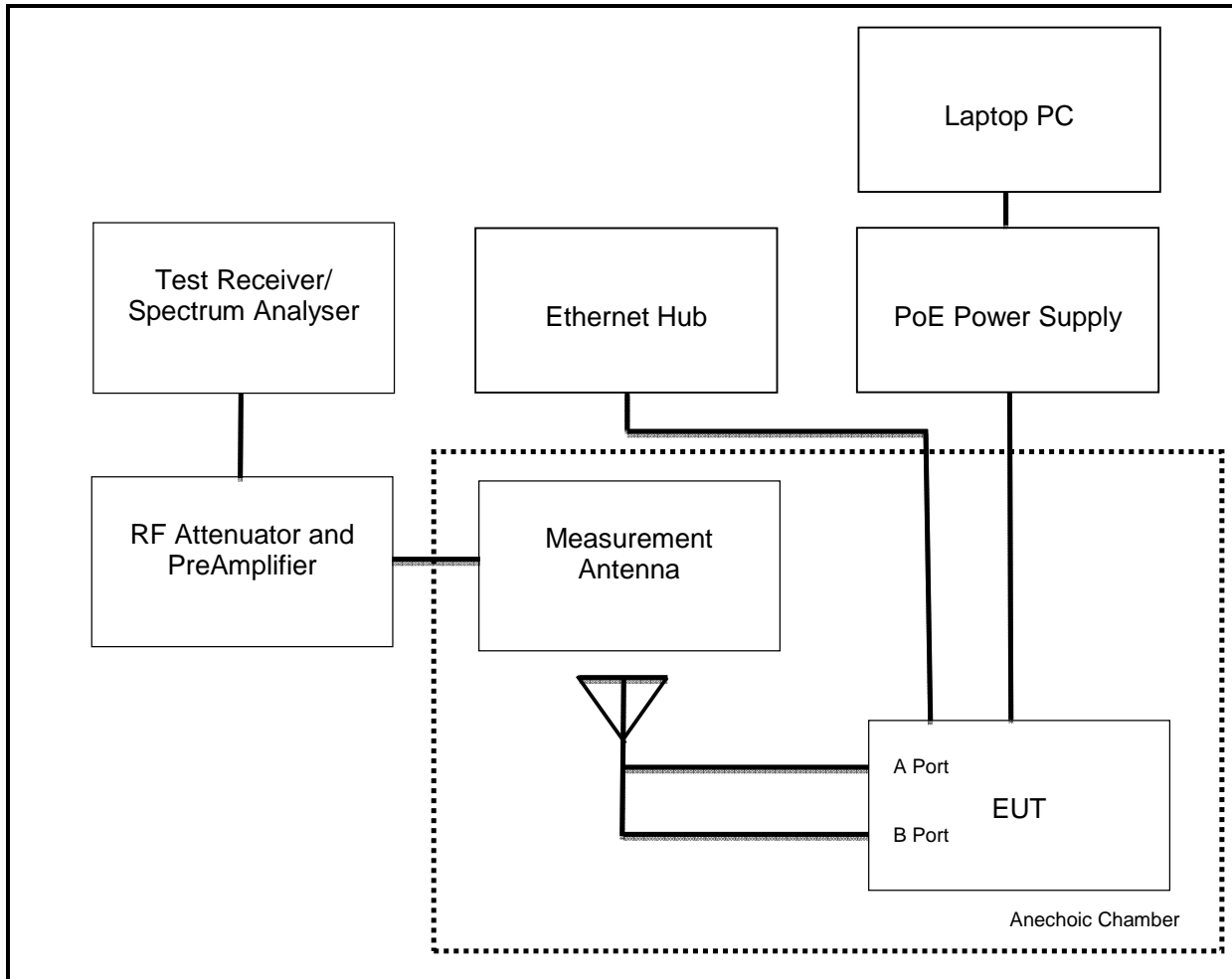
Temperature (°C):	23 to 26
Relative Humidity (%):	35 to 42

Note(s):

1. Radiated spurious emissions testing was performed with the EUT transmitting at maximum power on a 5 MHz channel with QPSK modulation. This configuration produced the highest emission levels and was therefore deemed to be worst case. The EUT was transmitting at >99% duty cycle. The highest gain antenna of each antenna type was tested using the appropriate maximum power setting.
2. For the 4' parabolic antenna, pre-scans were performed with the EUT transmitting on the middle channel of the 5.25-5.35 GHz band, in accordance with FCC Part 15.407(b)(2) which states all emissions outside of the 5.15-5.35 GHz band shall not exceed -27 dBm/MHz e.i.r.p. Part 15.407(b)(6) states unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209. Part 15.407(b)(7) states the provisions of 15.205 apply, i.e. restricted bands of operation.
3. For all other antennas, pre-scans were performed with the EUT transmitting on the middle channel of the 5.47-5.725 GHz band, in accordance with FCC Part 15.407(b)(3) which states all emissions outside of the 5.47-5.725 GHz band shall not exceed -27 dBm/MHz e.i.r.p. Part 15.407(b)(6) states unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209. Part 15.407(b)(7) states the provisions of 15.205 apply, i.e. restricted bands of operation.
4. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor, preamplifier gain, attenuator loss and cable loss.
5. 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.
6. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed in the centre of the chamber turntable. The EUT and antenna were mounted onto a pole in a typical end-user configuration and interconnected using the RF cables supplied by the manufacturer. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
7. **All emissions shown on the prescan plots were investigated. The highest emission level was compared to the applicable limit to obtain the margin. All other emissions were found to be >20 dB below the applicable limit or ambient and therefore not recorded.**

Transmitter Radiated Emissions (continued)

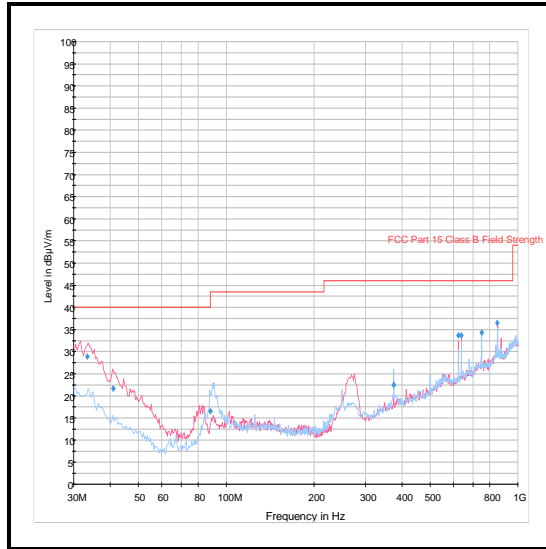
Test setup for radiated measurements:



Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / 4' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
850.000	Vertical	36.4	46.0	9.6	Complied

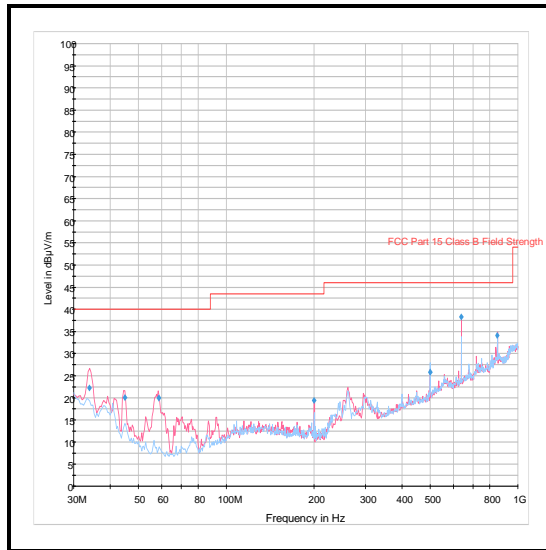


Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / 2' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
639.996	Vertical	38.3	46.0	7.7	Complied

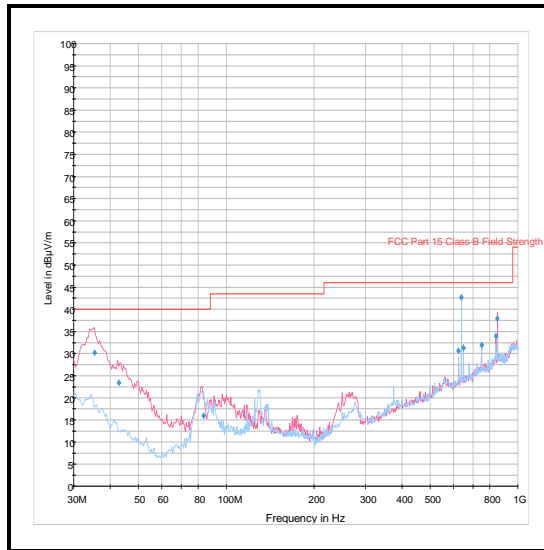


Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Out of Band Radiated Emissions (continued)

Results: Middle Channel / QPSK / Plate Antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
639.988	Horizontal	42.7	46.0	3.3	Complied

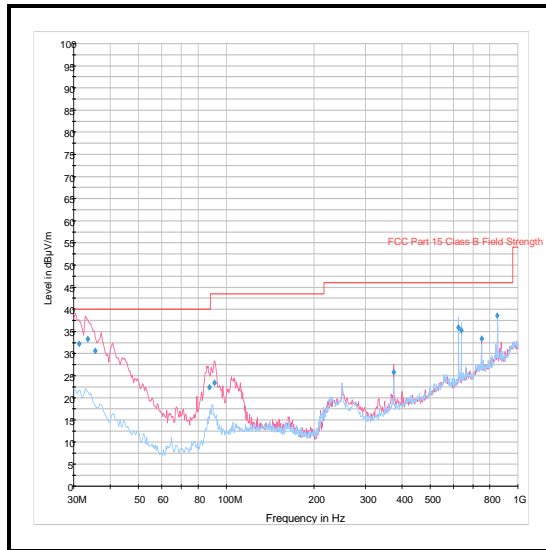


Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Sectorised Antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
850.000	Horizontal	38.5	46.0	7.5	Complied

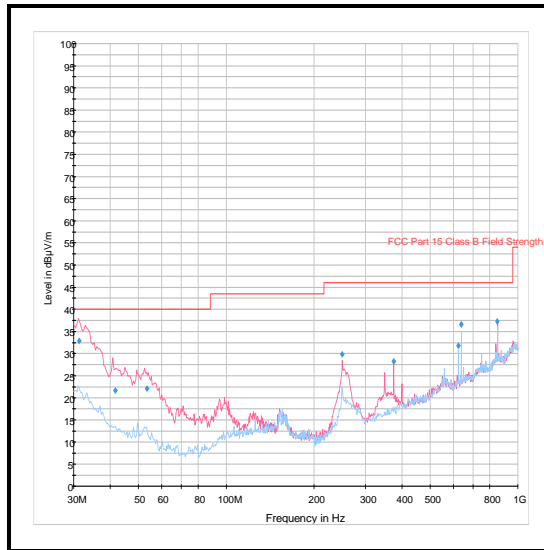


Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Emissions (continued)

Results: Middle Channel / QPSK / Omnidirectional Antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
250.013	Vertical	29.7	46.0	16.3	Complied



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Out of Band Radiated Emissions (continued)**Test Summary:**

Test Engineers:	Ian Watch & Georgios Vrezas	Test Dates:	29 June 2015 to 22 July 2015
Test Sample Serial Number:	F50980BB016F		

FCC Reference:	Parts 15.407(b)(2), 15.407(b)(3) & 15.209(a)
Test Method Used:	FCC KDB 789033 Section II.G & ANSI C63.10 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	22 to 26
Relative Humidity (%):	38 to 52

Note(s):

- Radiated spurious emissions testing was performed with the EUT transmitting at maximum power on a 5 MHz channel with QPSK modulation. This configuration produced the highest emission levels and was therefore deemed to be worst case. The EUT was transmitting at >99% duty cycle. The highest gain antenna of each antenna type was tested using the appropriate maximum power setting. The 4 foot parabolic antenna was used for tests in the 5.25-5.35 GHz band. The 2 foot parabolic antenna was used for tests in the 5.47-5.725 GHz band
- Pre-scans with the EUT transmitting on the middle channel were performed according to FCC Parts 15.407(b)(2)/15.407(b)(3) which state all emissions outside of the band will not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, i.e. restricted bands of operation.
- 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.
- Tests were performed as field strength measurements and any emissions in non-restricted bands converted to an E.I.R.P. value in dBm in accordance with FCC KDB 789033 Section II.G.2 using a conversion factor of 95.2. The measured values incorporates the calibrated antenna factor and cable loss.
- The final measured value, for the given emission, incorporates the calibrated antenna factor, preamplifier gain, attenuator loss and cable loss.
- Where the highest levels of emissions or noise floor occurred in a restricted band, the maximum peak field strength level was compared to peak (74 dBµV/m) and average (54 dBµV/m) limits. Where the highest levels of emission or noise floor occurred in a non-restricted band, the maximum field strength measured was converted to E.I.R.P. and compared to the -27 dBm/MHz E.I.R.P. limit. The -27 dBm/MHz E.I.R.P. limit was converted to a field strength limit of 68.2 dBµV/m at a measurement distance of 3 metres.
- All other emissions shown on the pre-scan plots were investigated and found to be below the measurement system noise floor or ambient.
- 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 1.5 metres above the test chamber floor in the centre of the chamber turntable. The EUT was placed as close to 1.5 metres as the antenna mounting bracket and RF cables allowed. All measurement antennas were placed at a fixed height of 1.5 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 Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)**Results: Bottom Channel / QPSK / 4' Parabolic Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
5478.630	Vertical	-37.2	-27.0	10.2	Complied
6084.600	Vertical	-37.8	-27.0	10.8	Complied

Results: Middle Channel / QPSK / 4' Parabolic Antenna

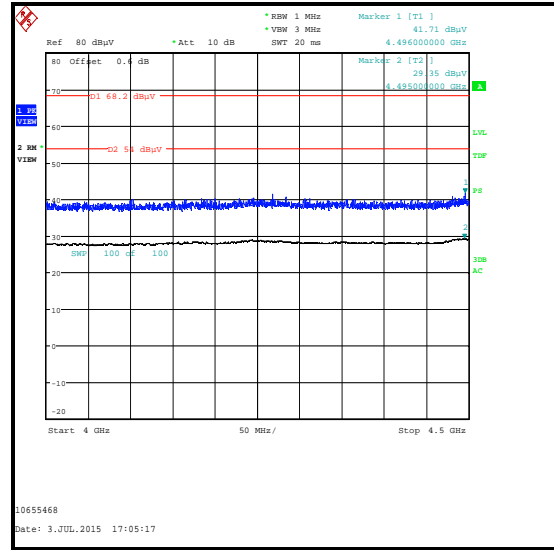
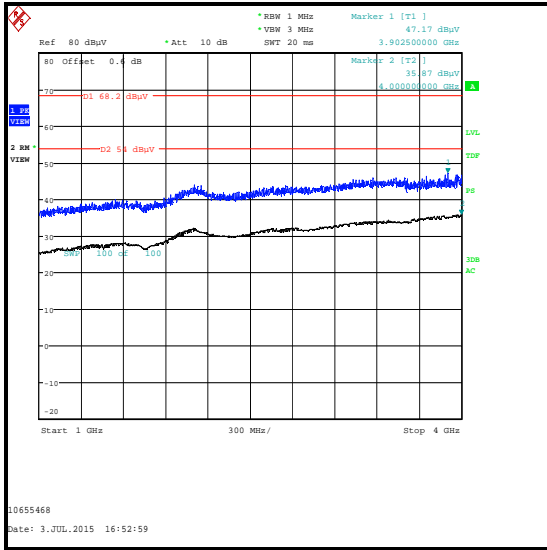
Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
5984.340	Vertical	-36.1	-27.0	9.1	Complied
6006.400	Vertical	-37.2	-27.0	10.2	Complied

Results: Top Channel / QPSK / 4' Parabolic Antenna

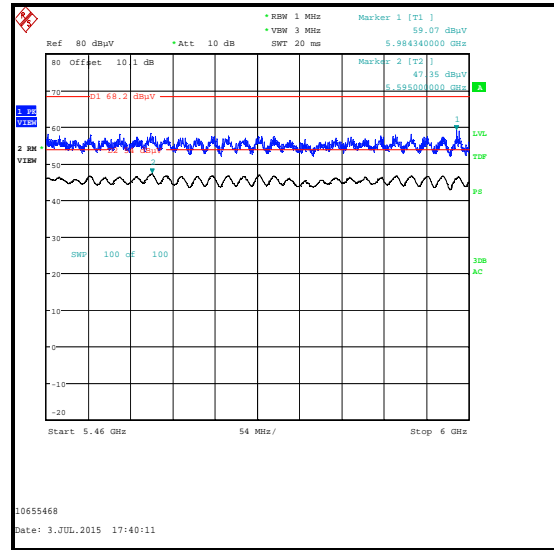
Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
5595.270	Vertical	-36.5	-27.0	9.5	Complied
6063.800	Vertical	-36.3	-27.0	9.3	Complied

Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / 4' Parabolic Antenna

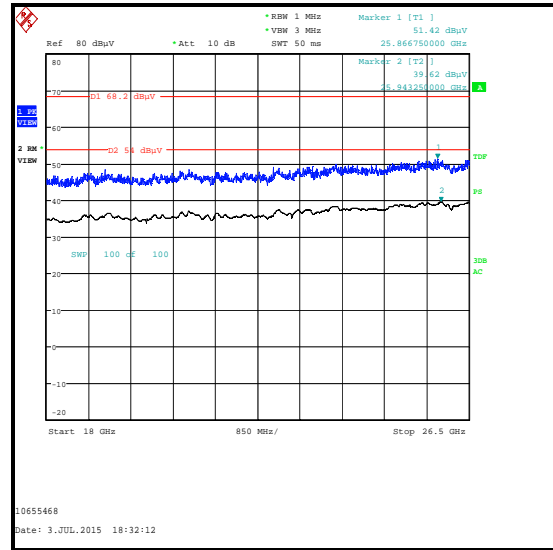
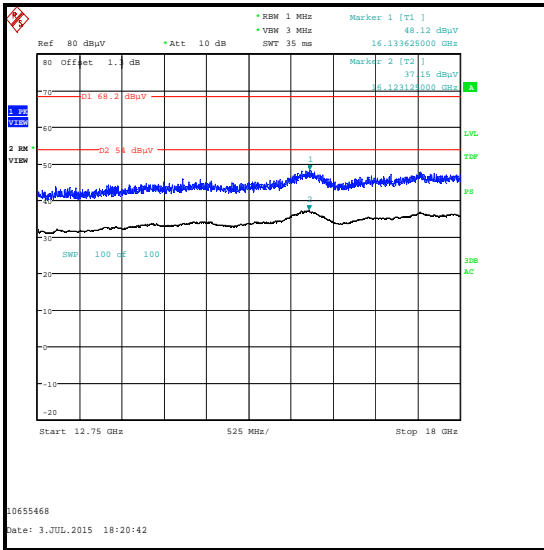
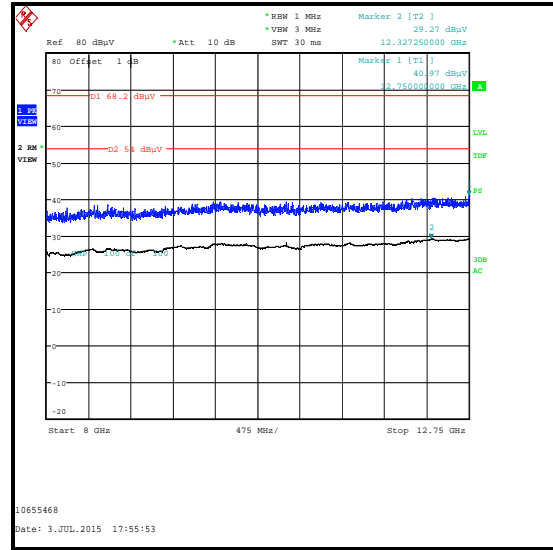
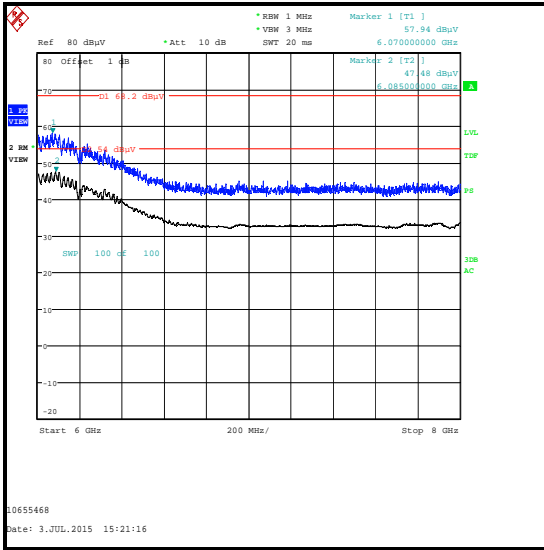


4.5 GHz to 5.46 GHz
Refer to Transmitter Band Edge Radiated Emissions
section of this test report



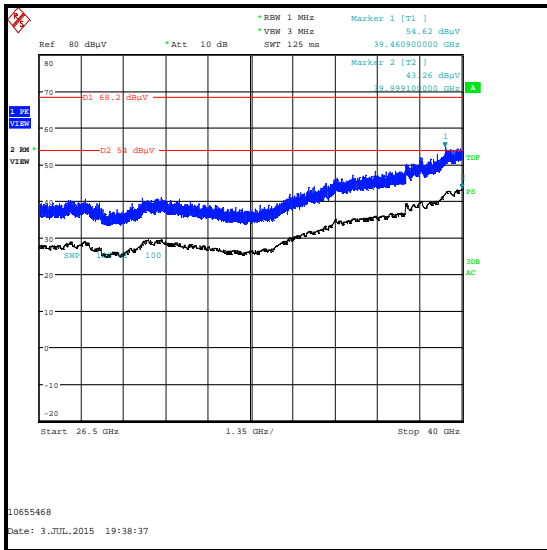
Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / 4' Parabolic Antenna



Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / 4' Parabolic Antenna



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

Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)**Results: Bottom Channel / QPSK / Plate Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6086.200	Vertical	-37.9	-27.0	10.9	Complied

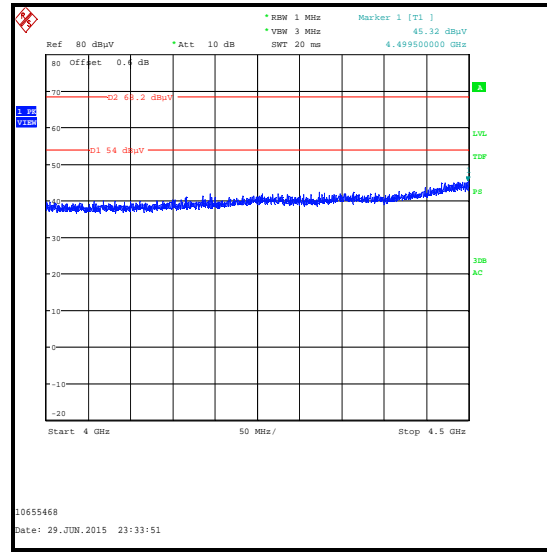
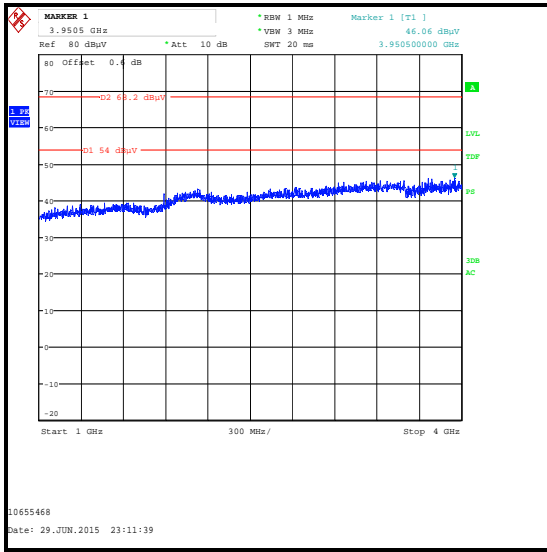
Results: Middle Channel / QPSK / Plate Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6005.000	Vertical	-37.1	-27.0	10.1	Complied

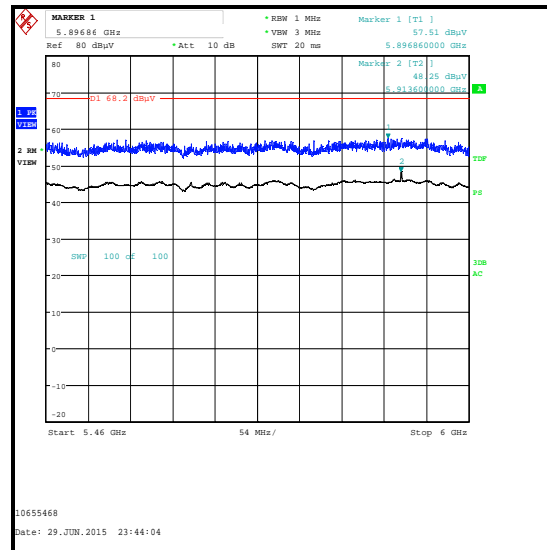
Results: Top Channel / QPSK / Plate Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6025.600	Vertical	-37.1	-27.0	10.1	Complied

Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

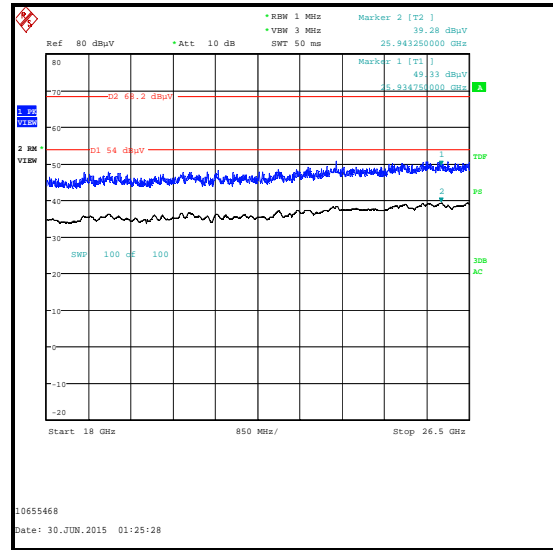
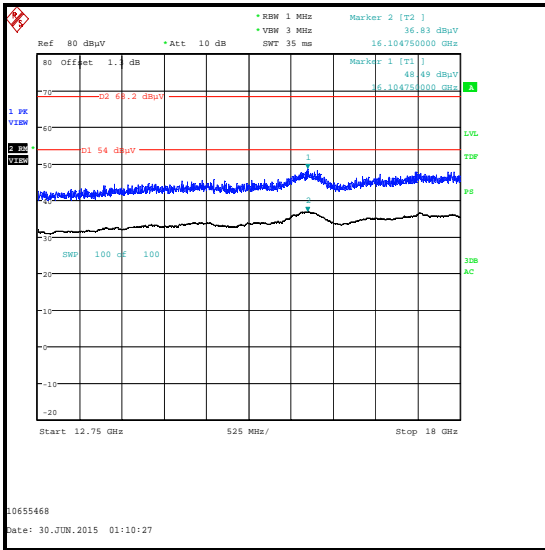
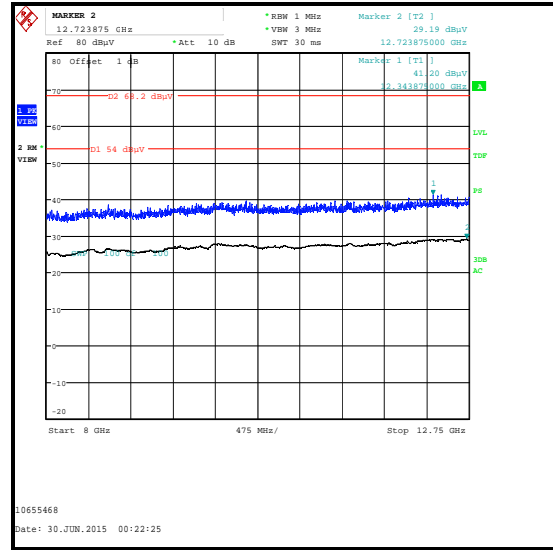
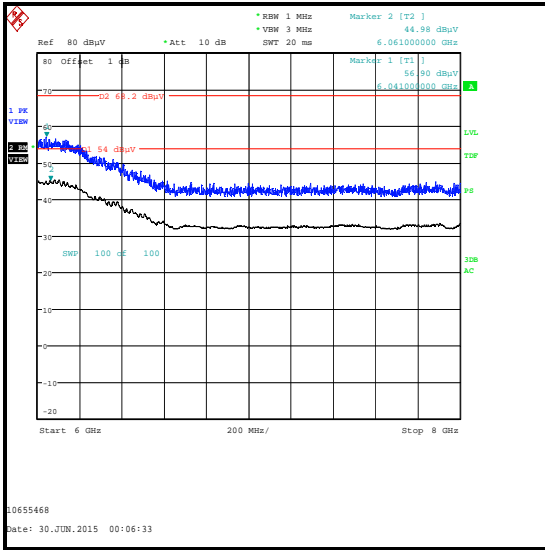


4.5 GHz to 5.46 GHz
Refer to Transmitter Band Edge Radiated Emissions
section of this test report



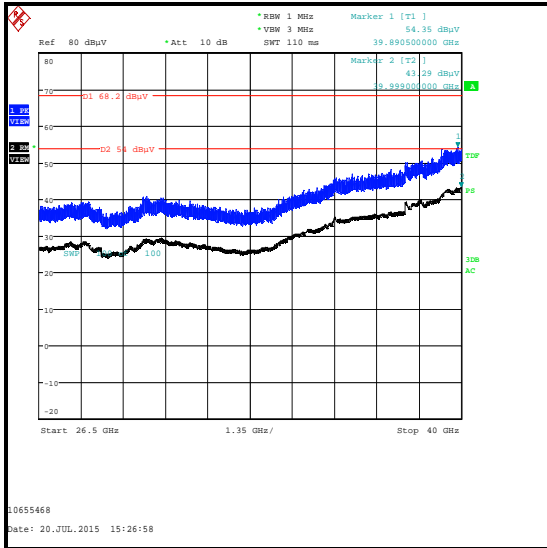
Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Plate Antenna



Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Plate Antenna



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

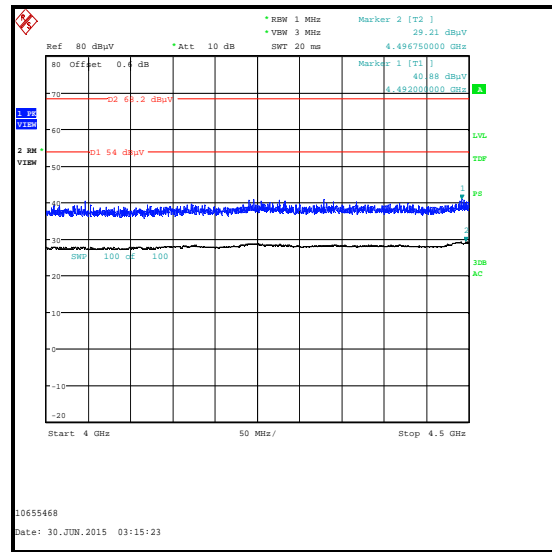
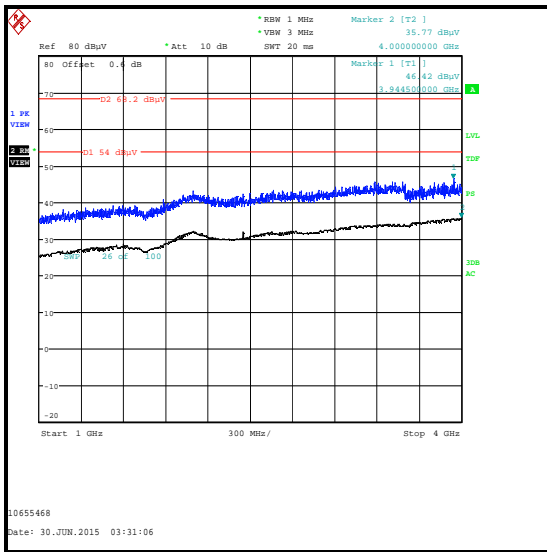
Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Sectorised Antenna

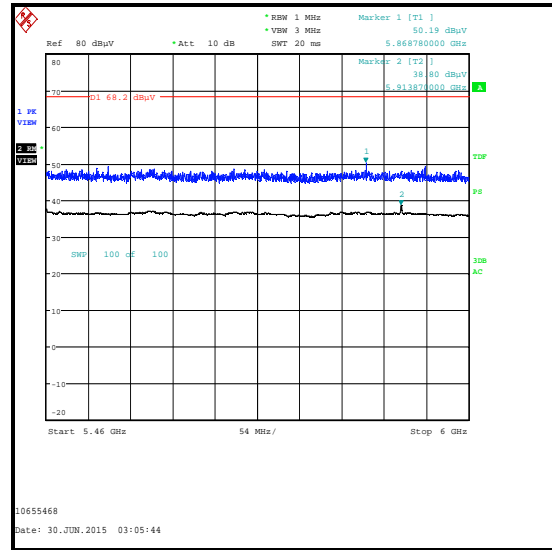
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
39941.000	Vertical	55.0	74.0	19.0	Complied

Results: Middle Channel / QPSK / Sectorised Antenna

Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
39994.500	Vertical	43.2	54.0	10.8	Complied

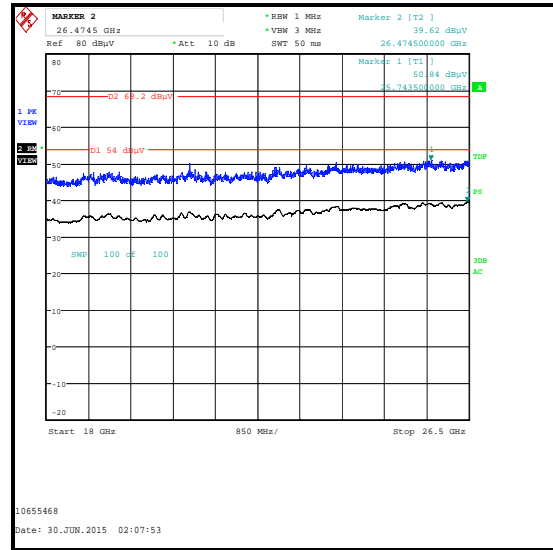
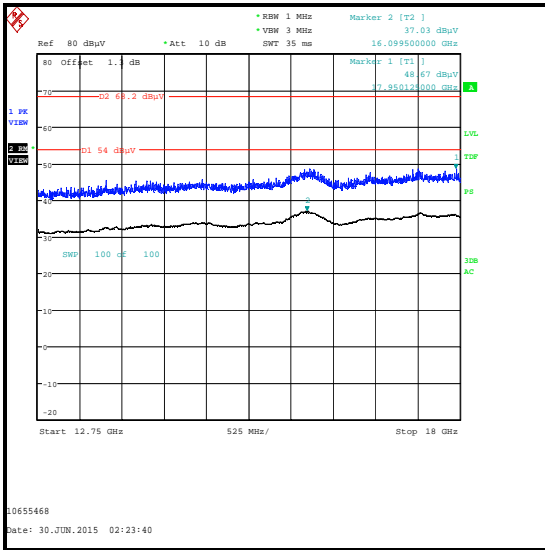
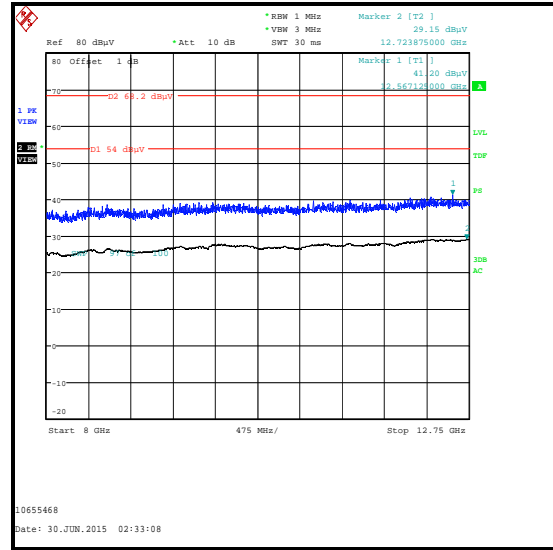
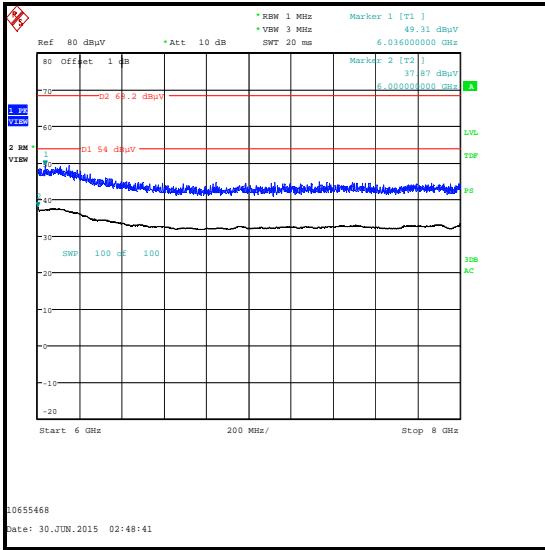


4.5 GHz to 5.46 GHz
Refer to Transmitter Band Edge Radiated Emissions section of this test report



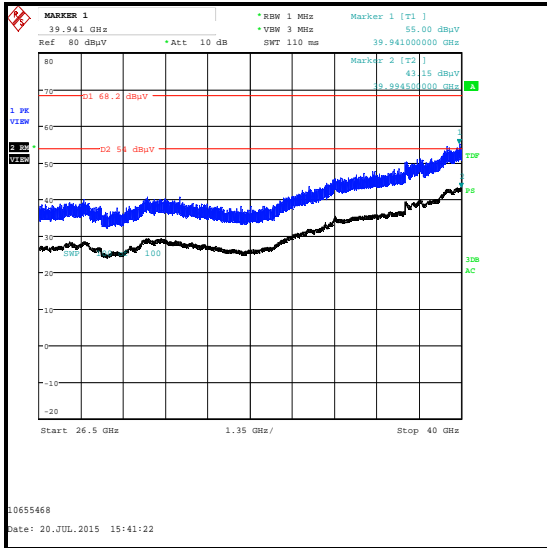
Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Sectorised Antenna



Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Sectorised Antenna



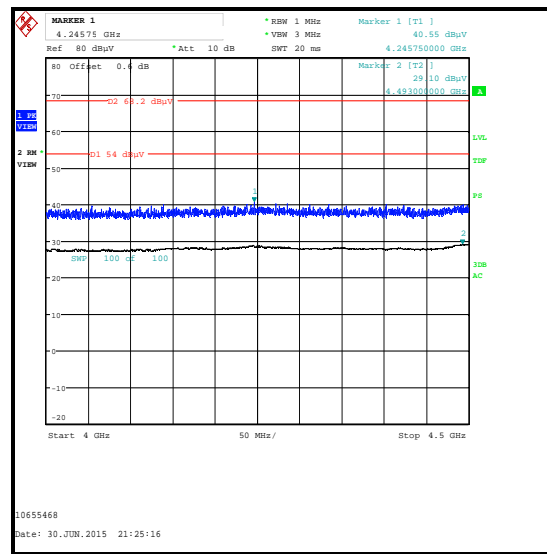
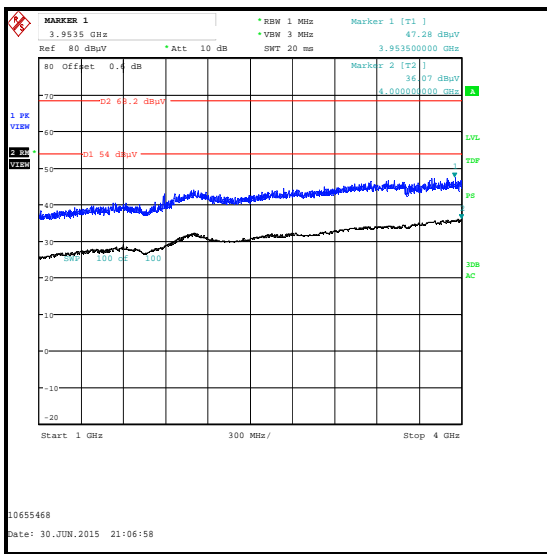
Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Omnidirectional Antenna

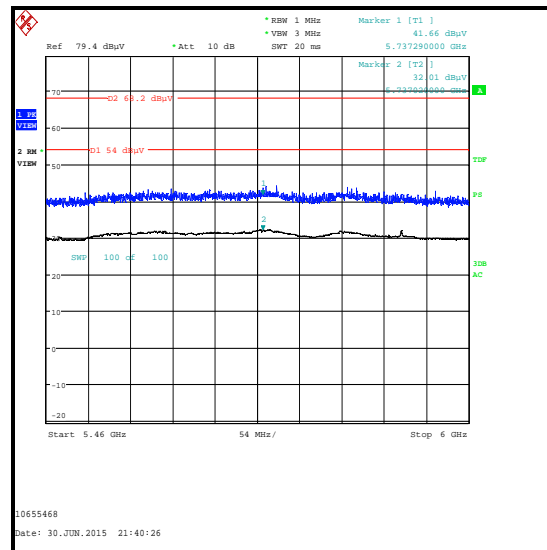
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
39997.000	Vertical	54.2	74.0	19.8	Complied

Results: Middle Channel / QPSK / Omnidirectional Antenna

Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
39982.500	Vertical	43.3	54.0	10.7	Complied

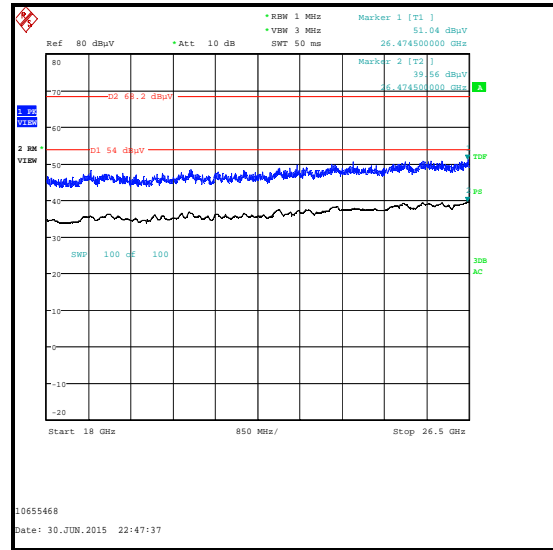
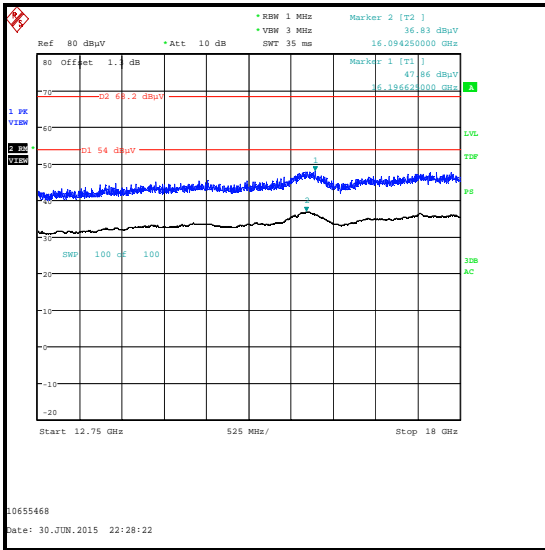
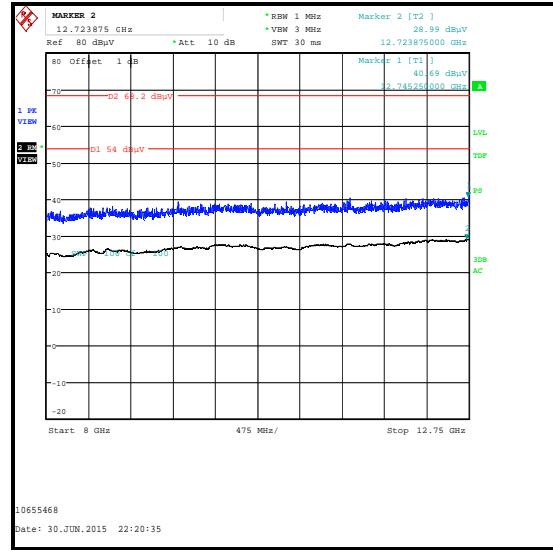
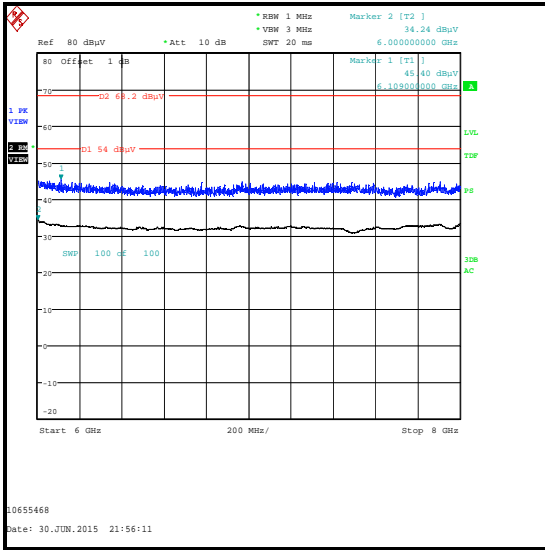


4.5 GHz to 5.46 GHz
Refer to Transmitter Band Edge Radiated Emissions section of this test report



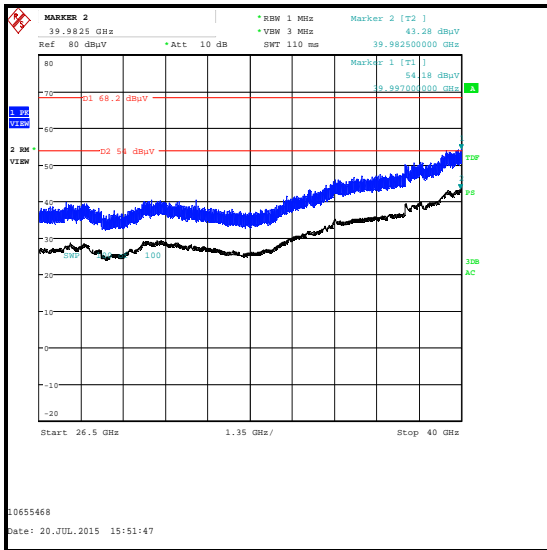
Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Omnidirectional Antenna



Transmitter Out of Band Radiated Emissions 5.25-5.35 GHz Band (continued)

Results: Middle Channel / QPSK / Omnidirectional Antenna



Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)**Results: Bottom Channel / QPSK / 2' Parabolic Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5376.005	Vertical	59.5	74.0	14.5	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5375.945	Vertical	51.1	54.0	2.9	Complied

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6026.000	Vertical	-39.9	-27.0	12.9	Complied

Results: Middle Channel / QPSK / 2' Parabolic Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5375.900	Vertical	59.1	74.0	14.9	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5375.948	Vertical	51.1	54.0	2.9	Complied

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6019.000	Vertical	-39.8	-27.0	12.8	Complied

Results: Top Channel / QPSK / 2' Parabolic Antenna

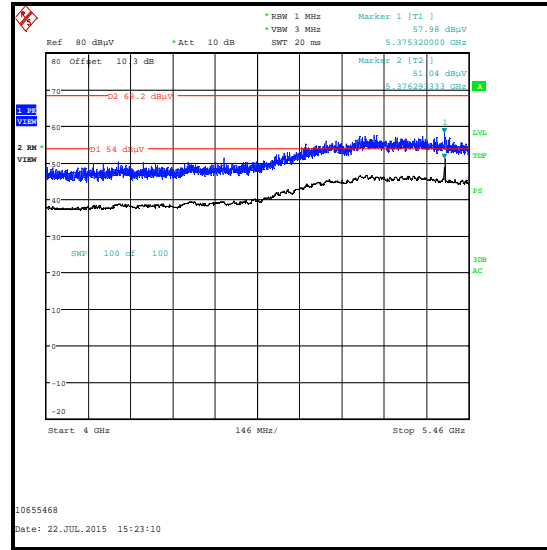
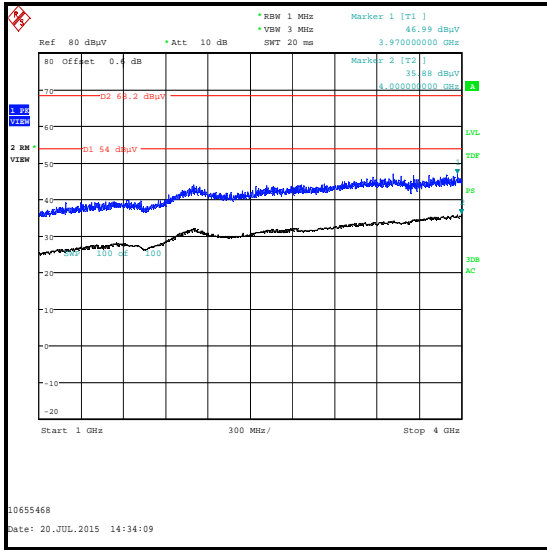
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5376.363	Vertical	60.1	74.0	13.9	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5376.088	Vertical	51.0	54.0	3.0	Complied

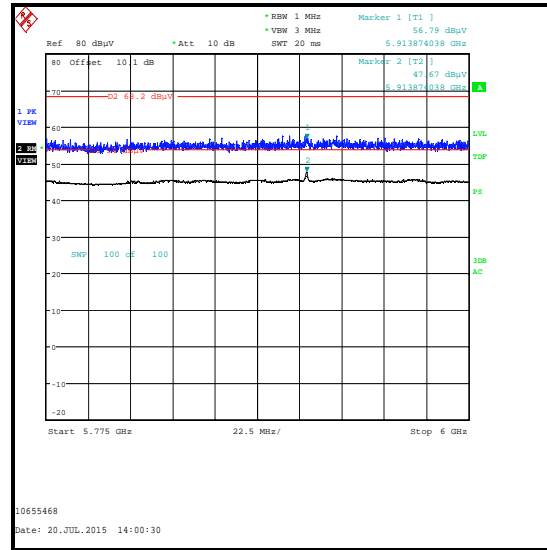
Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6008.000	Vertical	-38.8	-27.0	11.8	Complied

Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / 2' Parabolic Antenna

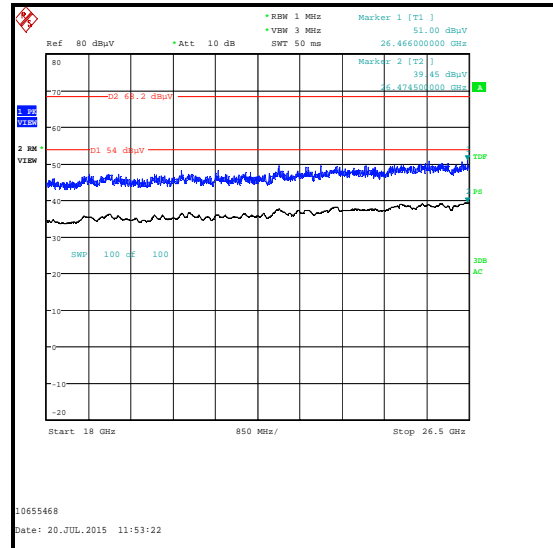
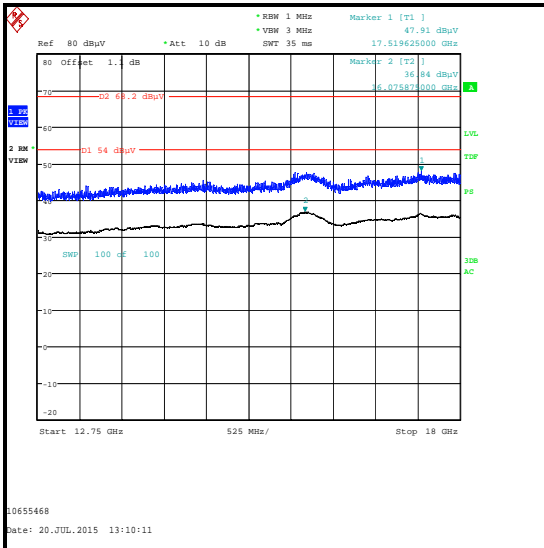
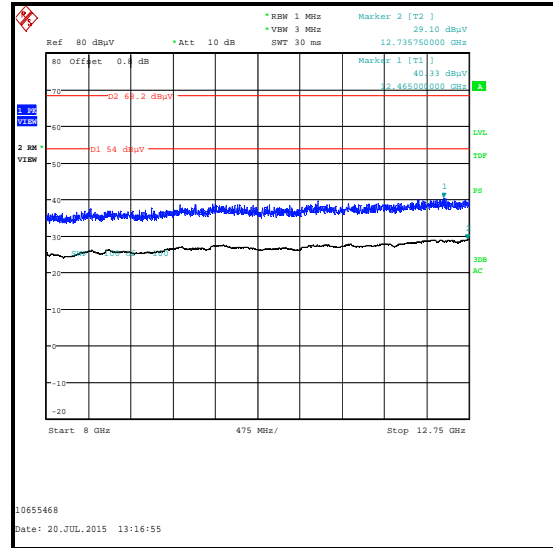
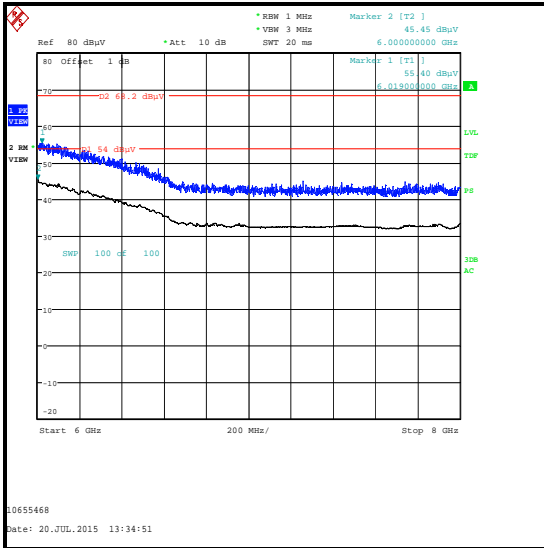


5.46 GHz to 5.775 GHz
Refer to Transmitter Band Edge Emissions
section of this test report



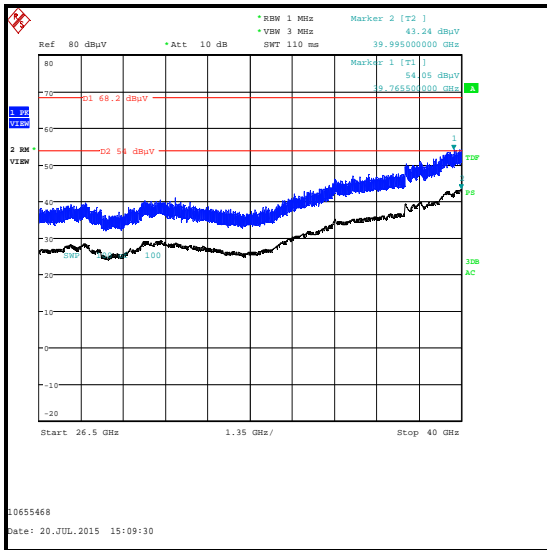
Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / 2' Parabolic Antenna



Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / 2' Parabolic Antenna



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

Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)**Results: Bottom Channel / QPSK / Plate Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5375.940	Vertical	59.4	74.0	14.6	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5376.007	Vertical	53.1	54.0	0.9	Complied

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6080.000	Vertical	-39.7	-27.0	12.7	Complied

Results: Middle Channel / QPSK / Plate Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5375.913	Vertical	62.5	74.0	11.5	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5376.045	Vertical	53.1	54.0	0.9	Complied

Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6069.000	Vertical	-39.3	-27.0	12.3	Complied

Results: Top Channel / QPSK / Plate Antenna

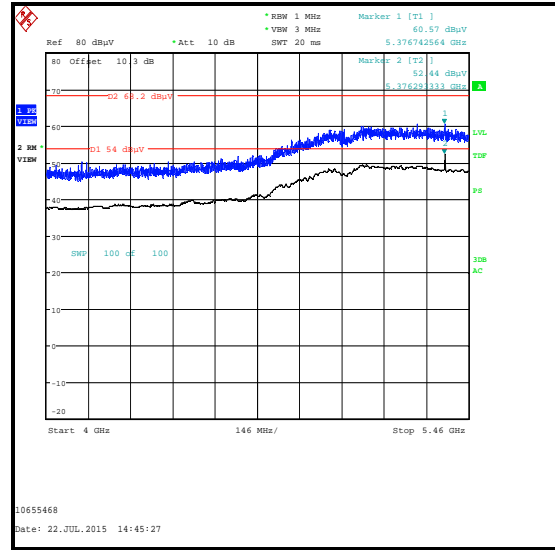
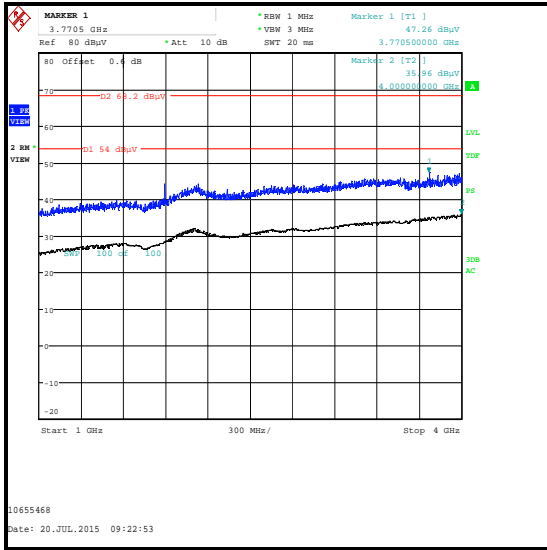
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5375.802	Vertical	63.1	74.0	10.9	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5376.050	Vertical	53.2	54.0	0.8	Complied

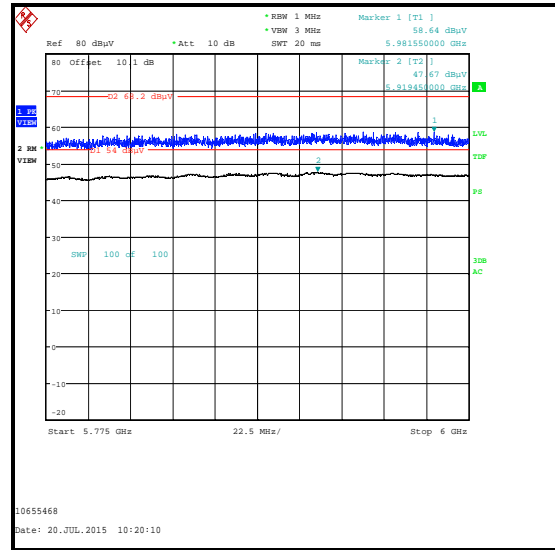
Frequency (MHz)	Antenna Polarity	Peak Level (dBm/MHz)	Peak Limit (dBm/MHz EIRP)	Margin (dB)	Result
6096.000	Vertical	-39.7	-27.0	12.7	Complied

Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Plate Antenna

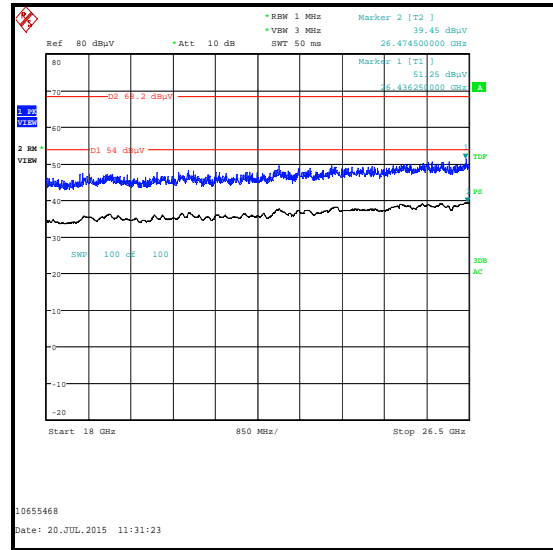
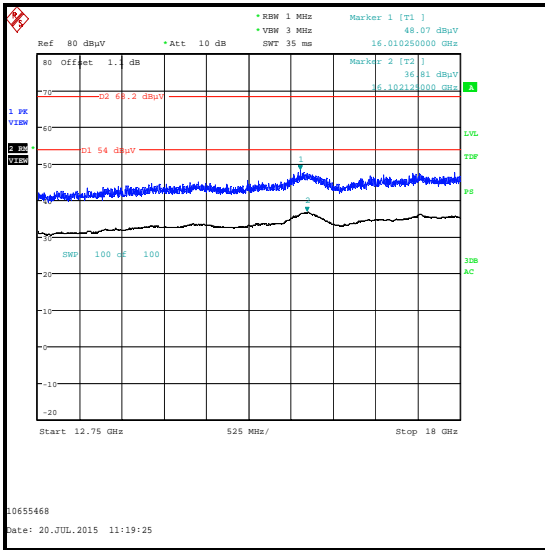
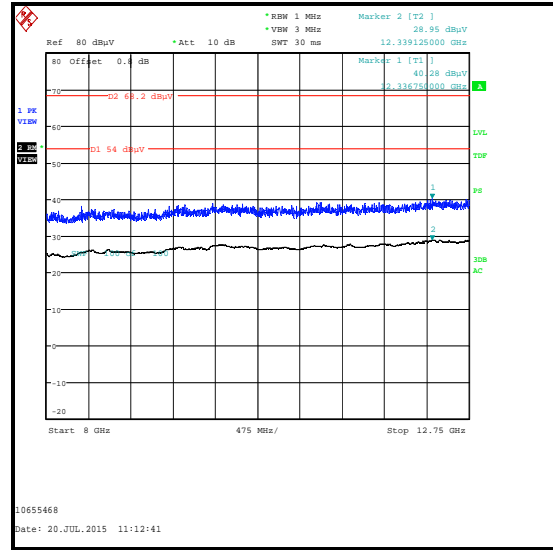
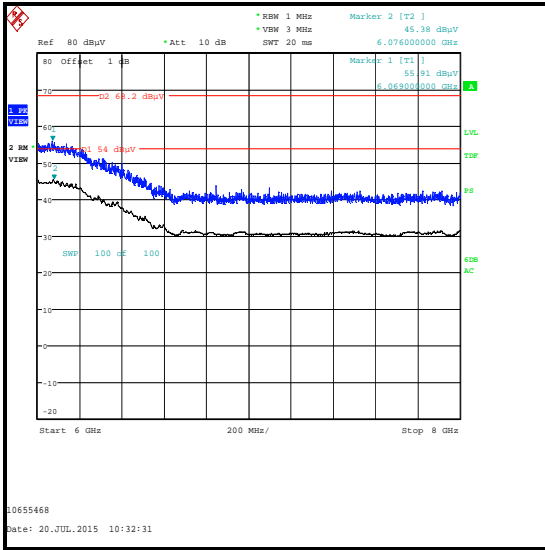


5.46 GHz to 5.775 GHz
Refer to Transmitter Band Edge Emissions
section of this test report



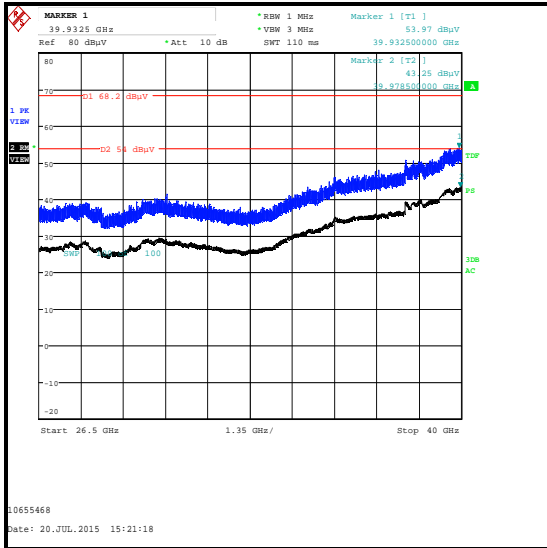
Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Plate Antenna



Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Plate Antenna



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

Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)**Results: Bottom Channel / QPSK / Sectorised Antenna**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5375.867	Vertical	54.4	74.0	19.6	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5375.933	Vertical	44.6	54.0	9.4	Complied

Results: Middle Channel / QPSK / Sectorised Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5376.187	Vertical	56.8	74.0	17.2	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5375.983	Vertical	46.0	54.0	8.0	Complied

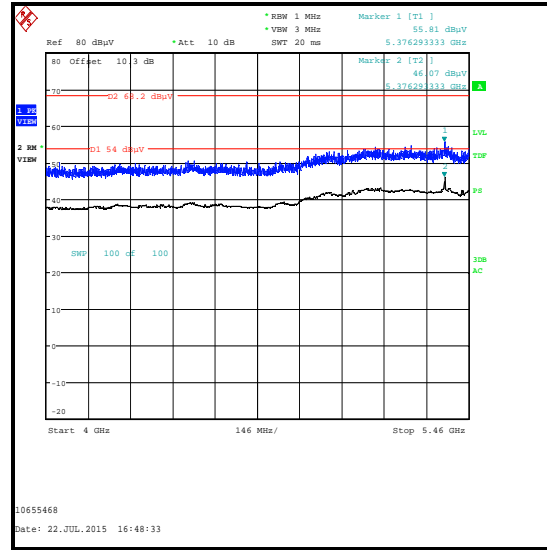
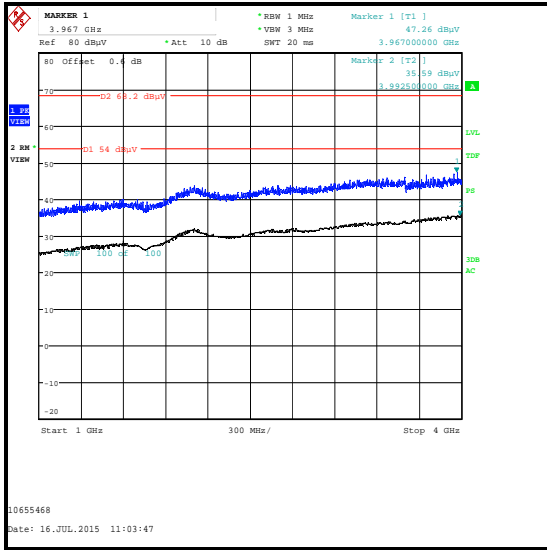
Results: Top Channel / QPSK / Sectorised Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
5375.922	Vertical	54.2	74.0	19.8	Complied

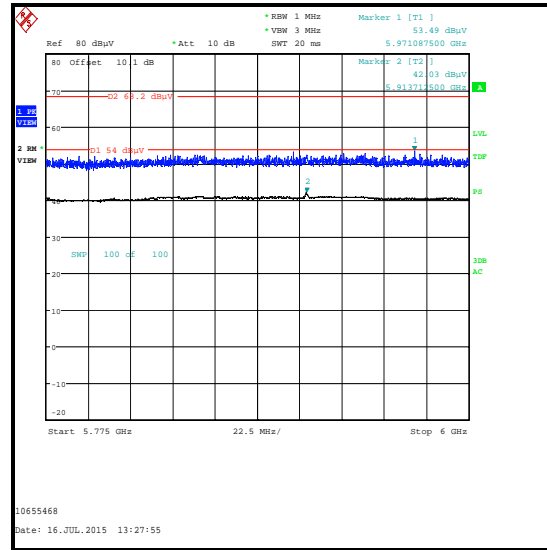
Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5376.027	Vertical	44.4	54.0	9.6	Complied

Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Sectorised Antenna

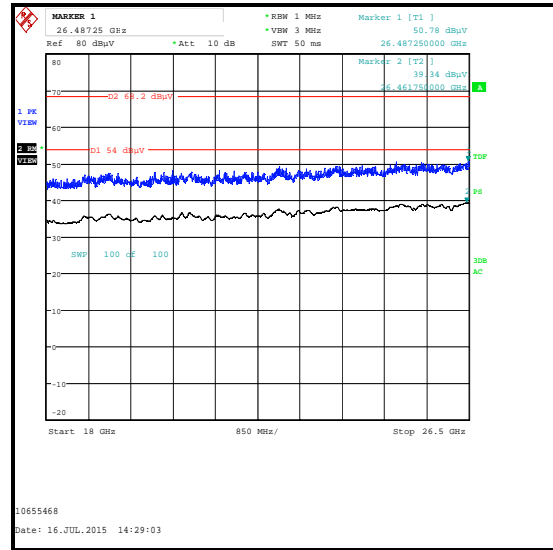
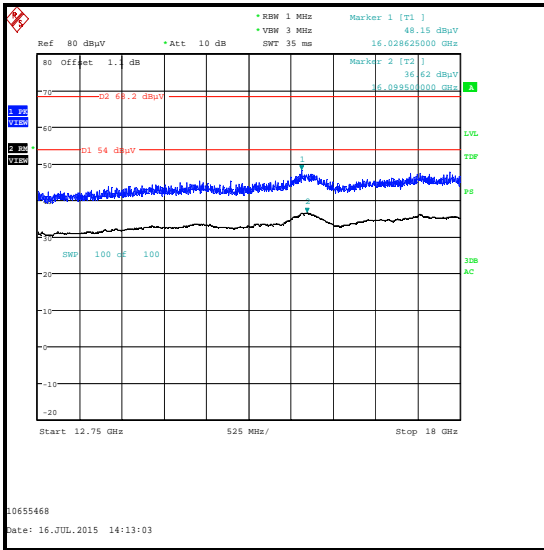
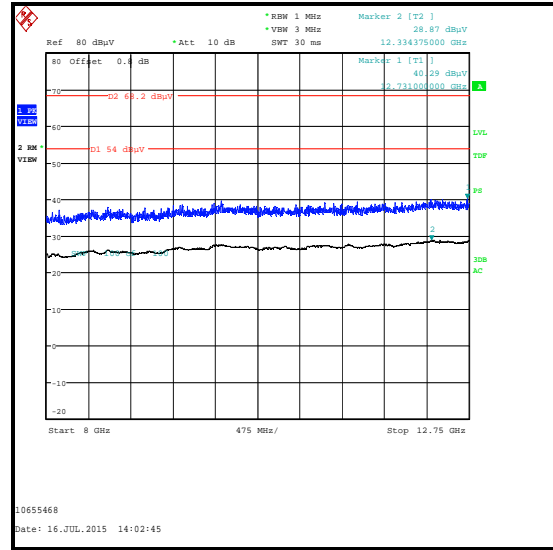
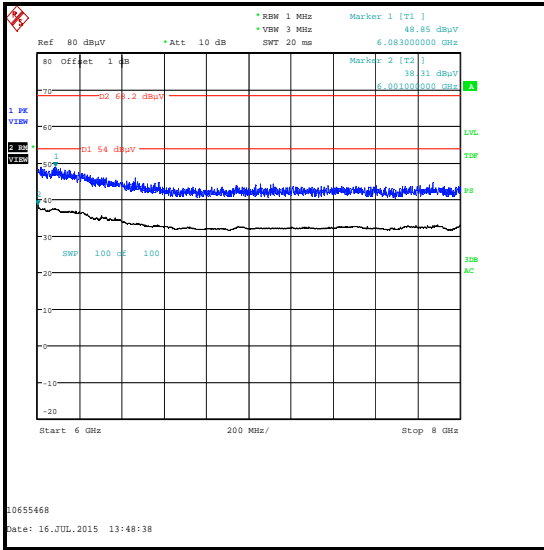


5.46 GHz to 5.775 GHz
Refer to Transmitter Band Edge Emissions
section of this test report



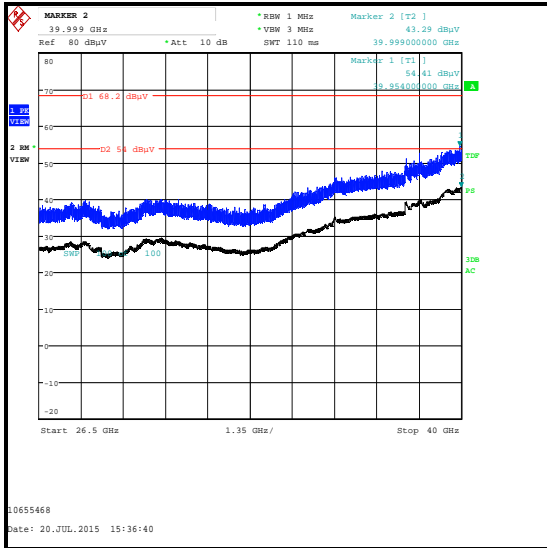
Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Sectorised Antenna



Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Sectorised Antenna



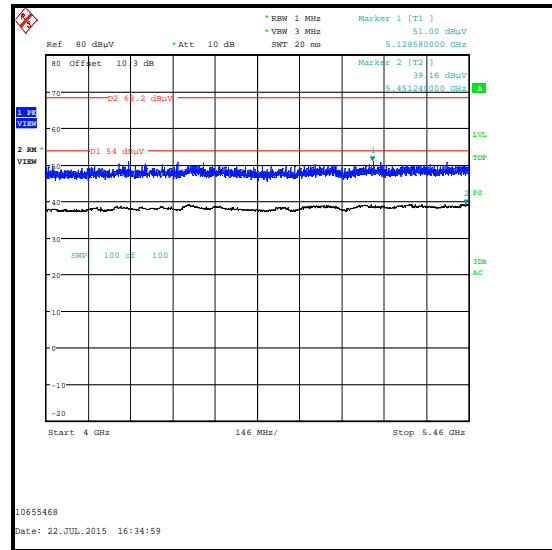
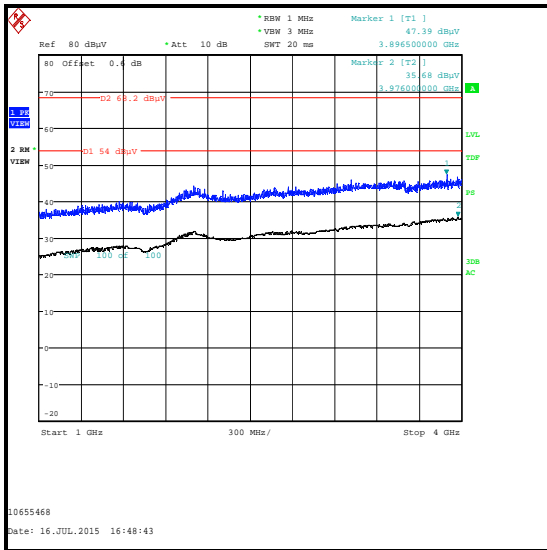
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

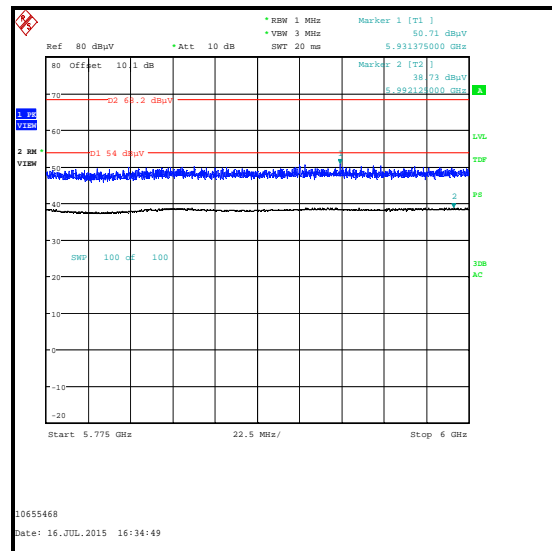
Results: Middle Channel / QPSK / Omnidirectional Antenna

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
39928.000	Vertical	54.3	74.0	19.7	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
39994.500	Vertical	43.2	54.0	10.8	Complied

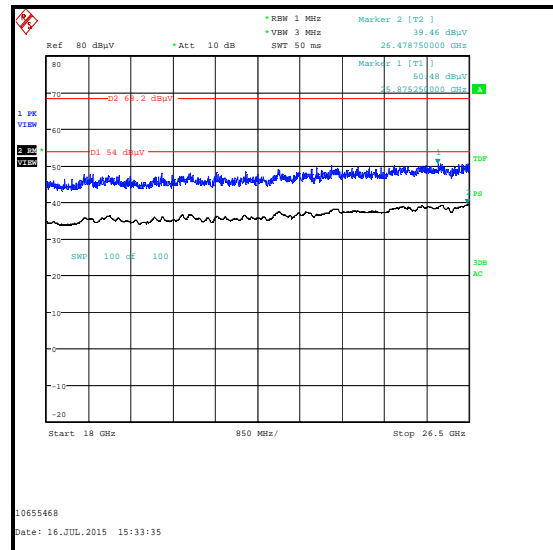
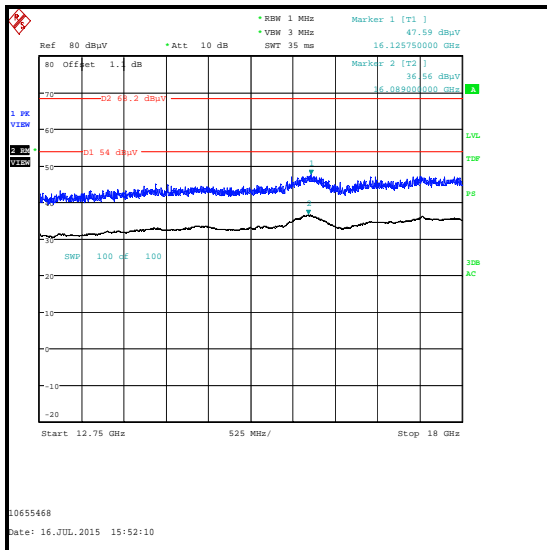
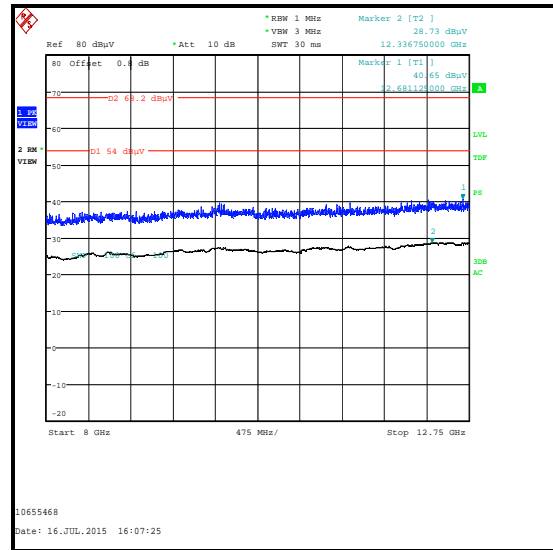
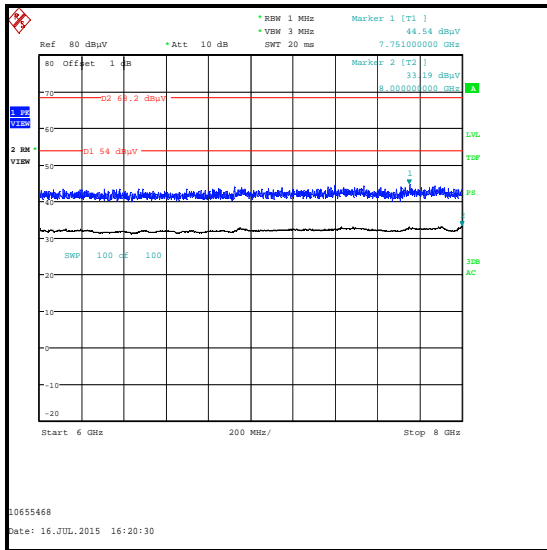


5.46 GHz to 5.775 GHz
Refer to Transmitter Band Edge Emissions
section of this test report



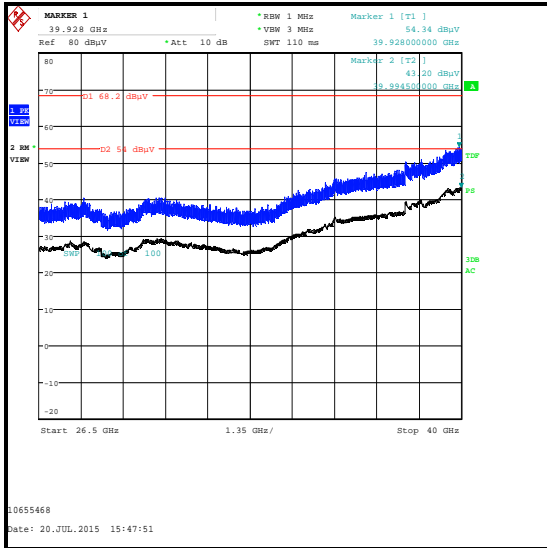
Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Omnidirectional Antenna



Transmitter Out of Band Radiated Emissions 5.47-5.725 Band (continued)

Results: Middle Channel / QPSK / Omnidirectional Antenna



Transmitter Out of Band Radiated Emissions (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	19 Mar 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	08 Dec 2015	12
G0543	Pre Amplifier	Sonoma	310N	230801	06 Aug 2015	3
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
M1874	Test Receiver	Rohde & Schwarz	ESU	100553	12 Jun 2016	12
A2134	Low Pass Filter	AtlanTecRF	AFL-05000	300195	17 Apr 2016	12
A1834	RF Attenuator	Hewlett Packard	8491B	10444	05 Mar 2016	12
A1980	High Pass Filter	AtlanTecRF	AFH-06000	09110900393	17 Apr 2016	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A2176	High Pass Filter	AtlanTecRF	AFH-07000	800980	17 Apr 2016	12
A1396	RF Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 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	20249-20	330	20 Dec 2015	12
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
M1390	26.5 GHz to 40 GHz Harmonic Mixer	Farran Technology	WHMP 28	FTL1677B	Calibrated before use	N/A
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	Calibrated before use	N/A
A1878	WG22 Adaptor	Quasar	QRA22PQB 402BKF	N/A	Calibrated before use	N/A
M1630	Spectrum Analyser	Rohde & Schwarz	ESU 40	100233	20 Feb 2016	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12