



FCC Certification Test Report

Product Evaluated

**FID 200202 - 10 MHz CF1/7 Configurations Support - B41-A (original)
TDD RRH (LTE BBU)
(10MHz, 10MHz+10MHz, 10MHz +10MHz+ 10MHz,
20MHz+10MHz+10MHz Contiguous Carriers)
(10MHz+10MHz, 10MHz+10MHz+10MHz, 20MHz+10MHz+10MHz Non
Contiguous Carriers)
(FCC ID: AS5BBTRX-15)**

Customer

Alcatel-Lucent USA, Inc
600-700 Mountain Avenue
Murray Hill, New Jersey 07974-0636 USA

Test Laboratory

Global Product Compliance Laboratory

Alcatel-Lucent USA, Inc
600-700 Mountain Avenue, Rm 5B-108
Murray Hill, New Jersey 07974-0636 USA

Date: June 17, 2016

Revisions

Date	Revision	Section	Change
6/17/2016	0		Initial Release

Nokia Global Product Compliance Laboratory represents to the client that testing was done in accordance with standard procedures as applicable, and that reported test results are accurate within generally accepted commercial ranges of accuracy in accordance with the scope of our NVLAP Accreditation. Nokia Global Product Compliance reports only apply to the specific samples tested. This report is the property of the client. This report shall not be reproduced except in full without the written approval of the Nokia Global Product Compliance Laboratory.

Nokia Global Product Compliance Laboratory is accredited with the US Department of Commerce National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 7 Code of Federal Regulations for offering test services for selected test methods in Electromagnetic Compatibility; Voluntary Control Council for Interference (VCCI), Japan; Australian Communications and Media Authority (ACMA). The laboratory is ISO 9001:2008 Certified.

Nokia Global Product Compliance Laboratory represents to the client that the laboratory's accreditation or any of its calibration or test reports in no way constitutes or implies product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Prepared By: Steve Gordon

Approved By: Ray Johnson

Signed: Steve Gordon 6/17/2016
Compliance Engineer

Signed: Raymond Johnson 6/17/2016
Technical Manager

Table of Contents

1. ATTESTATION OF TEST RESULTS	4
2. SUMMARY OF THE TEST RESULTS	5
2.1 MEASUREMENT UNCERTAINTY	5
2.2 MEASUREMENT UNCERTAINTY FOR ANTENNA PORT TESTING:	5
3. GENERAL INFORMATION	6
3.1 PRODUCT DESCRIPTIONS	6
3.2 ANTENNA INFORMATION	7
4. REQUIRED MEASUREMENTS AND RESULTS	8
4.1 SECTION 2.1046 MEASUREMENT REQUIRED: RF POWER OUTPUT	9
4.1.1 <i>RF Power Output Measurement</i>	9
4.1.2 <i>Peak-to-Average Power Ratio Measurement</i>	9
4.2 SECTION 2.1047 MEASUREMENT REQUIRED: MODULATION CHARACTERISTICS	15
4.2.1 <i>Modulation Characteristics Measurement</i>	15
4.3 SECTION 2.1049 MEASUREMENT REQUIRED: OCCUPIED BANDWIDTH AND OUT-OF-BAND EMISSIONS	20
4.3.1 <i>Measurement of Occupied Bandwidth</i>	20
4.3.2 <i>Results:</i>	24
4.4 SECTION 2.1051 MEASUREMENT REQUIRED: SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS.....	51
4.4.1 <i>Results:</i>	51
4.5 SECTION 2.1055 MEASUREMENT REQUIRED: FREQUENCY STABILITY	151
4.5.1 <i>Frequency Stability Results:</i>	151
4.6 SECTION 2.1053 MEASUREMENT REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION	152
4.6.1 <i>Field Strength of Radiated Emissions Results:</i>	173
4.7 LIST OF TEST EQUIPMENT	178
4.8 FACILITIES AND ACCREDITATION	179

1. ATTESTATION OF TEST RESULTS

Company Name	Alcatel-Lucent USA, Inc.
FCC ID	AS5BBTRX-15
Product Name	FID 200202 - 10 MHz CF1/7 Configurations Support - B41-A (original) TDD RRH (LTE BBU)
Model Name	TD-RRH8x20-25
Part No	
Serial Number(s)	LBALLUW5144600014
Test Standard(s)	47 CFR FCC Part 27
Reference(s)	<ul style="list-style-type: none"> • 47 CFR FCC Part 2 and Part 27 • FCC KDB 971168 D01 • ANSI C63 .26 (2015)
Operating Frequency Band	PCS (Tx: 2496 -2690 MHz and Rx: 2496-2690 MHz), E-UTRAN Band 41
Technology	LTE
Test Frequency Range	10MHz – 26.5 GHz
Operation Mode(s)	8x8 MIMO
Submission Type	Class II Permissive Change
FCC Part 15 Subpart B Compliance	Compliance with Class B
Test Date	May 6 – May 27, 2016
Test Laboratory	Global Product Compliance Laboratory 600-700 Mountain Avenue, Rm 5B-108 Murray Hill, New Jersey 07974-0636 USA

This is to certify that the above product has been evaluated and found to be in compliance with the Rules and Regulations set forth in the above standard(s). The data and the descriptions about the test setup, procedures and configuration presented in this report are accurate. The results of testing in this report apply only to the product/system which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Per the requirement of Section 2.911(d) Certification of Technical Test Data, I hereby certify that the technical test data are the results of tests either performed or supervised by me.

Steve Gordon
 Member of Technical Staff
 Global Product Compliance Laboratory
 Alcatel-Lucent USA, Inc

2. SUMMARY OF THE TEST RESULTS

47 CFR FCC Sections	Description of Tests	Compliance Results	Notes
2.1046	RF Power Output	Yes	
2.1047	Modulation Characteristics	Yes	
2.1049, 27.53	(a) Occupied Bandwidth (b) Out-of-Band Emissions	Yes	
2.1051, 27.53	Spurious Emissions at Antenna Terminals	Yes	
2.1053, 27.53	Field Strength of Spurious Radiation	Yes	
2.1055, 27.53	Measurement of Frequency Stability	NR	

NR: Not Required
 NA: Not Applicable

2.1 Measurement Uncertainty

The results of the calculations to estimate uncertainties for the several test methods and standards are shown in the Table below. These are the worst-case values.

Worst-Case Estimated Measurement Uncertainties

Standard, Method or Procedure	Condition	Frequency MHz	Expanded Uncertainty (k=2)
a. Classical Emissions, (e.g., ANSI C63.4, CISPR 11, 14, 22, etc., using ESHS 30,	Conducted Emissions	0.009 - 30	±3.5 dB
	Radiated Emissions (AR-5 Semi-Anechoic Chamber)	30 MHz – 200MHz H 30 MHz – 200 MHz V 200 MHz – 1000 MHz H 200 MHz – 1000 MHz V 1 GHz- 18 GHz	±4.79 dB ±5.12 dB ±4.79 dB ±4.91 dB ±3.3 dB

2.2 Measurement uncertainty for Antenna Port Testing:

- 9 kHz to 20 MHz: Frequency = 10 Hz, Amplitude = 0.5 dB
- 20 MHz to 1 GHz: Frequency = 100Hz, Amplitude = 0.5 dB
- 1 GHz to 10 GHz: Frequency = 10 kHz, Amplitude = 0.5 dB

3. GENERAL INFORMATION

3.1 Product Descriptions

The equipment under test (EUT) has the following specifications.

Table 3.1.1 Product Specifications

Specification Items	Description
Product Type	Compact Base Station (8Tx, 8Rx), 8x8 MIMO
Radio Type	Intentional Transceiver
Power Type	-48 VDC
Modulation	QPSK/16QAM, 64QAM
Operating Frequency Range	Tx 2496-2690 MHz/Rx 2496-2690 MHz
Channel Bandwidth	10 MHz, 10+10 MHz, 10 +10+10 MHz , 20+10+10 MHz
Max Conducted Power (Rated)	43 dBm per carrier, 43 dBm per port
Software Version	NEM LR16.1_D1.12
Hardware Version	RRH 8x20 MIMO
Antenna(s)	Refer to Section 3.2

The EUT supports the following carrier configurations:

Table 3.1.2 EUT Supported Configurations

Carrier Bandwidth (MHz)	Maximum No of Carriers per Path	Technology	Supported?
10	8	LTE	✓
10+10	8	LTE	✓
10+10+10	8	LTE	✓
20+10+10	8	LTE	✓

The operating band consists of the following bandwidths and spectrum:

Table 3.1.3 EUTRAN 2, Configurations

Tx Frequency (MHz)	Tx Frequency (MHz)	Tx Frequency (MHz)	Contiguous/Non-Contiguous	Bandwidth (MHz)
2496 - 2690			Contiguous	10
2496 - 2506	2506 - 2516		Contiguous	10 + 10
2630 - 2640	2680 - 2690		Non-Contiguous	10 + 10
2496 - 2506	2506 - 2516	2516 - 2526	Contiguous	10 +10 +10
2640 - 2650	2660 - 2670	2680 - 2690	Non-Contiguous	10 +10 +10
2496 - 2516	2516 - 2526	2526 - 2536	Contiguous	20 +10 +10
2630 - 2650	2660 - 2670	2680 - 2690	Non-Contiguous	20 +10 +10

3.2 Antenna Information

The product does not incorporate integrated antennas.

4. REQUIRED MEASUREMENTS AND RESULTS

The EUT is a Class II Permissive Change. Per 47CFR FCC Section 2.1033(c)(14), the following certification tests are required by Section 2.1046 through Section 2.1057. The measurement was conducted in accordance with the procedures set out in Section 2.1041.

47 CFR FCC Sections	Description of Tests	Compliance Results	Notes
2.1046	RF Power Output	Yes	
2.1047	Modulation Characteristics	Yes	
2.1049, 27.53	(a) Occupied Bandwidth (b) Out-of-Band Emissions	Yes	
2.1051, 27.53	Spurious Emissions at Antenna Terminals	Yes	
2.1053, 27.53	Field Strength of Spurious Radiation	Yes	
2.1055, 27.54	Measurement of Frequency Stability	NR	

NR: Not Required
NA: Not Applicable

4.1 Section 2.1046 MEASUREMENT REQUIRED: RF POWER OUTPUT

This test is a measurement of the total RF power level transmitted at the antenna-transmitting terminal, as shown in the accompanying test set-up diagram. The radio was tuned to a channel which is transmitting continuously in its operating frequency band. The power level of the base station was calibrated to allow the base station to operate at the manufacturer’s maximum rated mean power level, i.e., +43dBm (20W) per LTE carrier, per port and per unit at the antenna-transmitting terminal.

4.1.1 RF Power Output Measurement

Power measurements were conducted with a broadband Power Meter in the average mode per KDB 971168 D01. Before the testing was started, the Base Station was given a sufficient “warm-up” period as required.

The maximum rated mean power per carrier, per port and per unit at the antenna transmitting terminal was measured for LTE carriers at 10 MHz, 10+10 MHz, 10+10+10 MHz and 20+10+10 MHz carrier bandwidths with QPSK/16QAM and 64QAM modulation respectively across the entire operating frequency band. The maximum rated mean RF power outputs of the EUT measured are given in Table 4.1.1. The RF power output measured for each configuration was also shown as “Ref Lvl” in the plots provided in Sections 4.3 and 4.4.

Table 4.1.1 The Maximum Average RF Output Power of the EUT- Measured

Transmit Configuration	Measurement Configuration	Maximum Average RF Output Power		Maximum Derivation
		Watts	dBm	dB
8x8 MIMO	Per Antenna Port	20	43	≤ ± 1

4.1.1.1 RF Power Output Results:

The maximum mean RF power outputs of the EUT measured at its antenna transmitting terminals were measured in full compliance with the Rules of the Commission and are listed above.

4.1.2 Peak-to-Average Power Ratio Measurement

The Peak-to-Average Power Ratio (PAPR) of the EUT has also been measured per KDB 971168 D01 procedures for both 10MHz and 20MHz carriers at the lowest, middle and highest available channels of the operating band for QPSK/16QAM and 64QAM, respectively. The PAPR values (0.1% probability) of the EUT measured are all below 13dB. The maximum PAPR value measured is given in Table 4.1.2 and the plot below.

Table 4.1.2 The Maximum PAPR Value at 0.1% probability of the EUT

Configuration	Maximum PAPR Value at 0.1% probability (dB)
10+10+10 MHz Contiguous; QPSK/16QAM/64QAM,	8.21

4.1.2.1 Peak-to-Average Power Ratio Results:

The maximum Peak-to-Average Power Ratio (PAPR) of the EUT measured at its antenna transmitting terminals were measured to be in full compliance with the ≤ 13 dB Rules of the Commission and are listed above.

Figure 4.1.1 Test Set-Up for Measurement of Radio Frequency Power Output

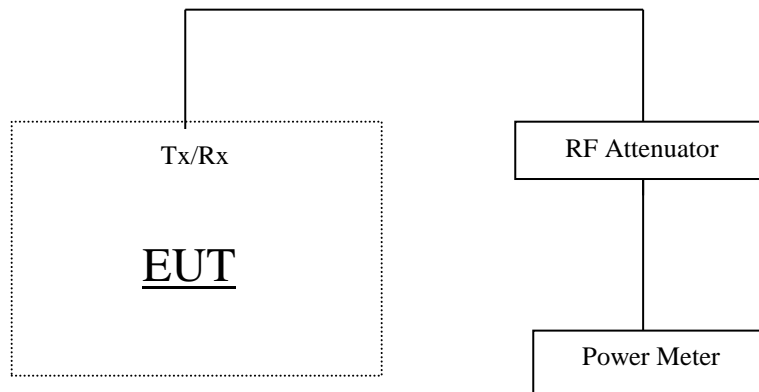
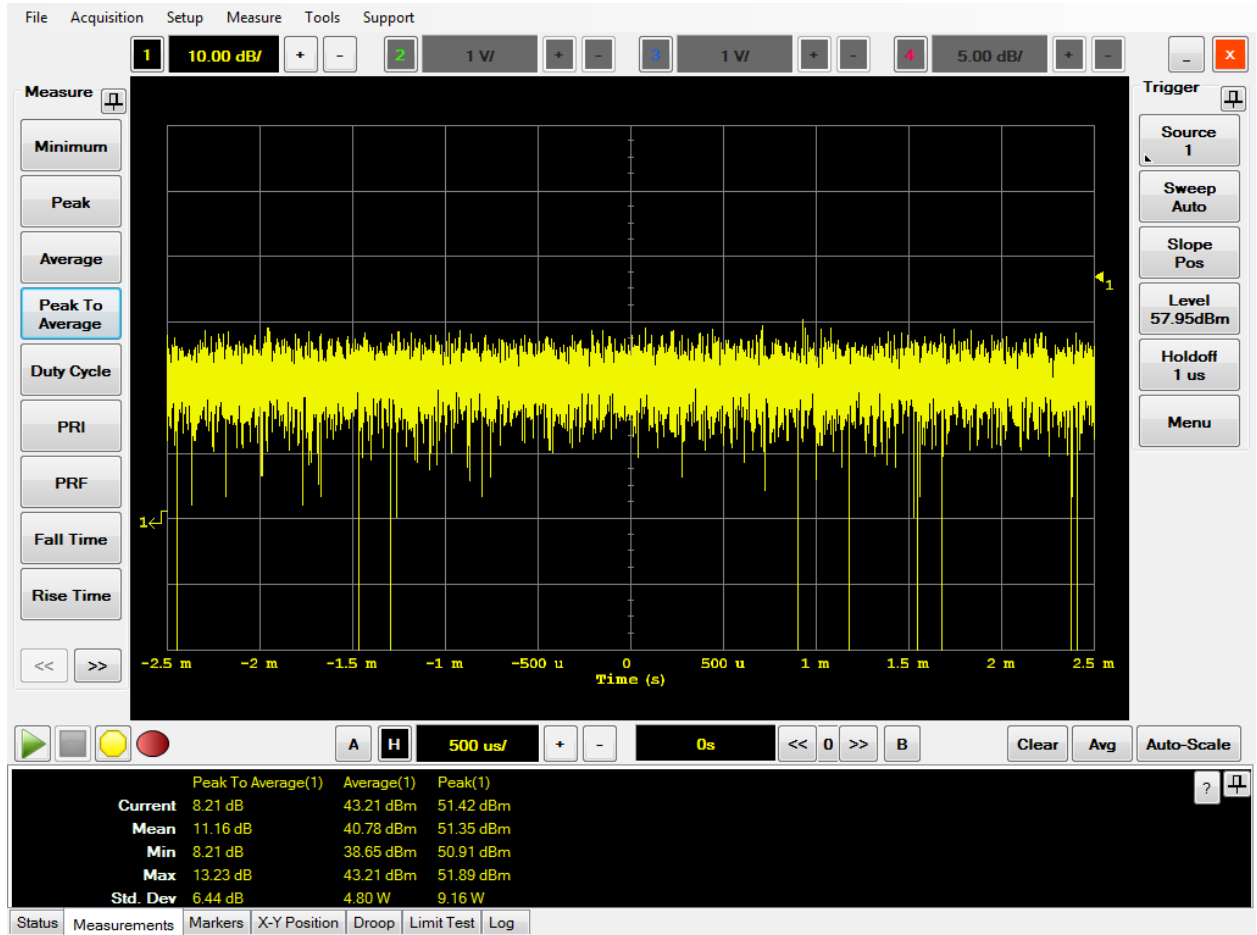
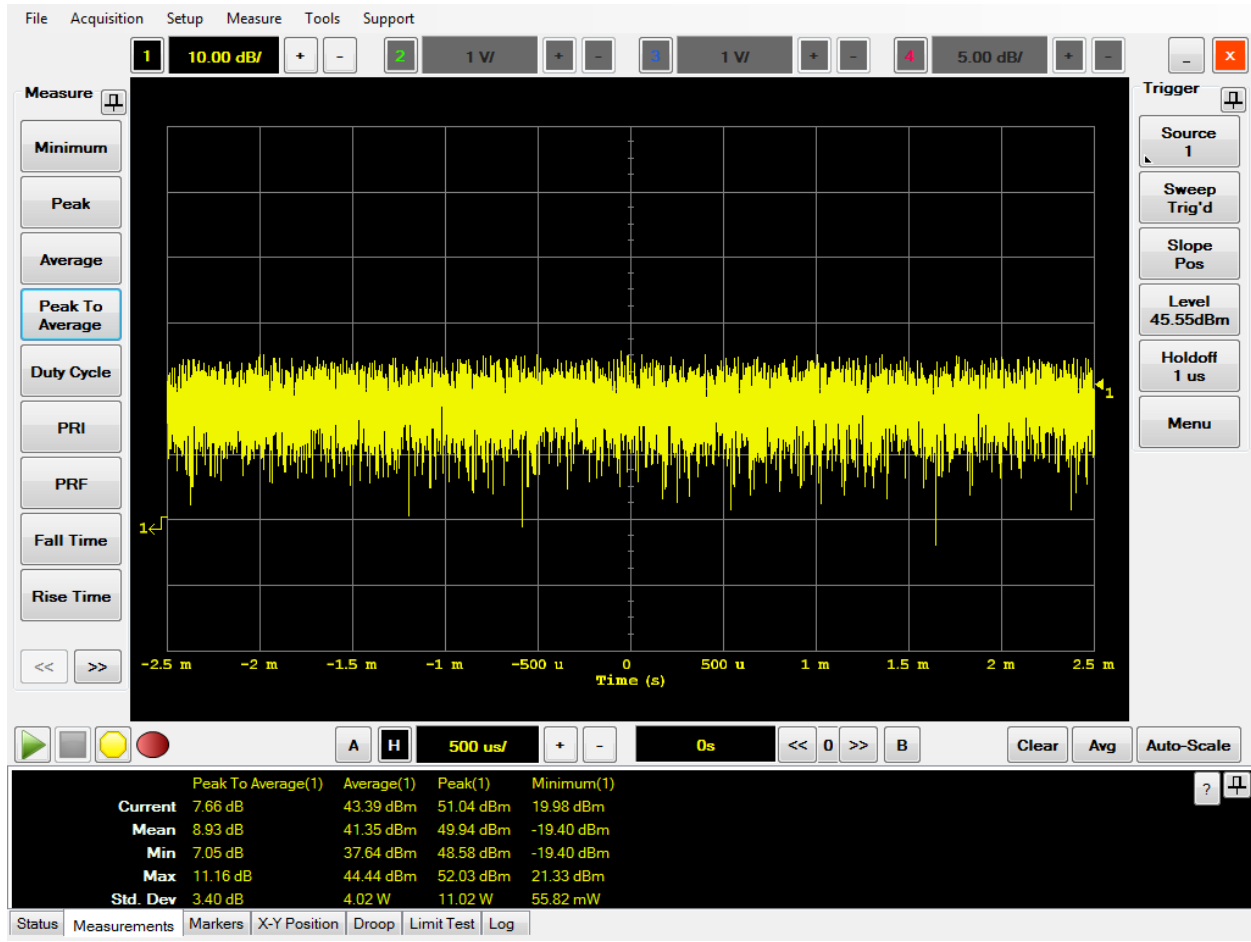


Figure 4.1.2 PAPR Plot Measured with the Maximum Values

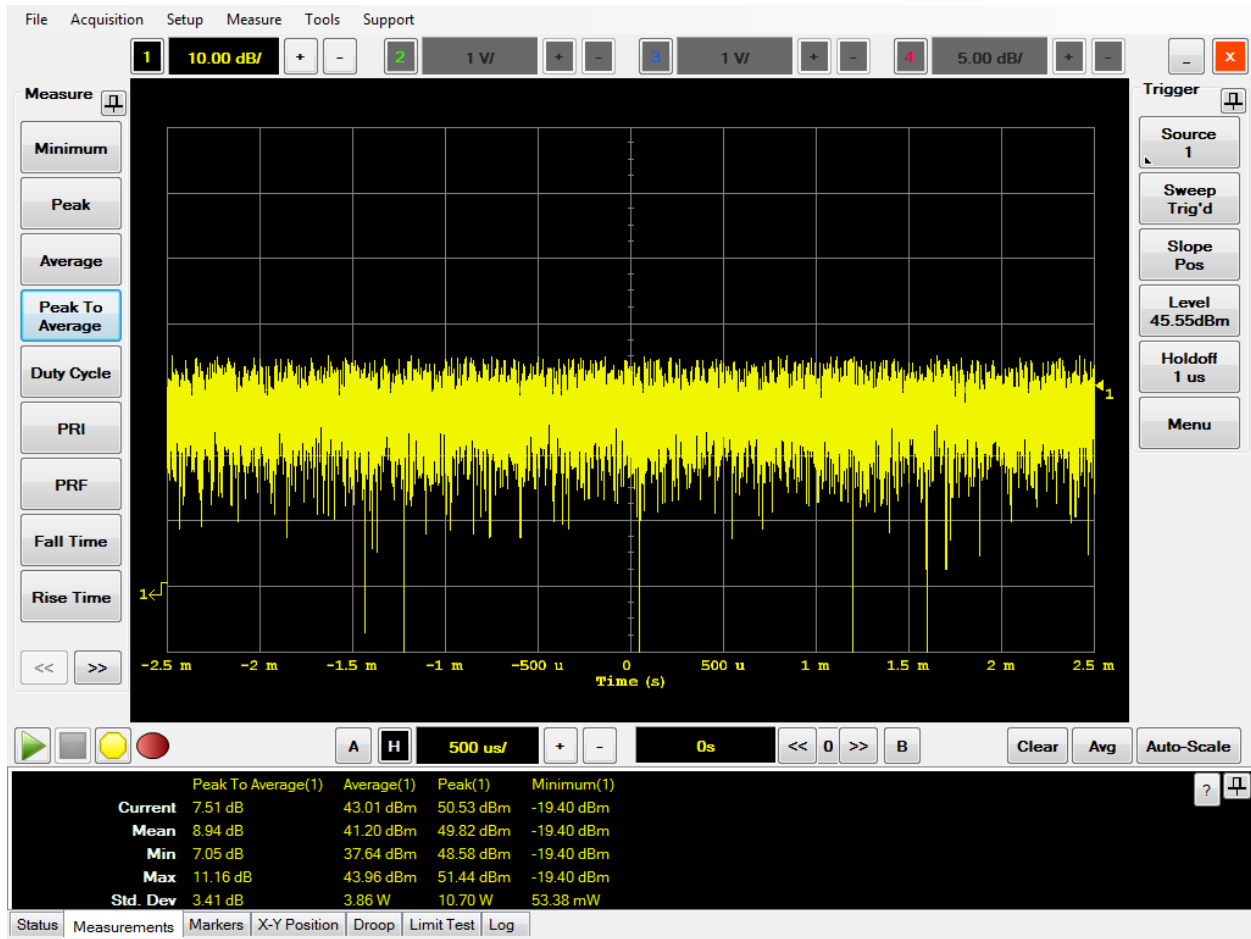
QPSK\16QAM\64QAM (10+10+10 MHz Contiguous)



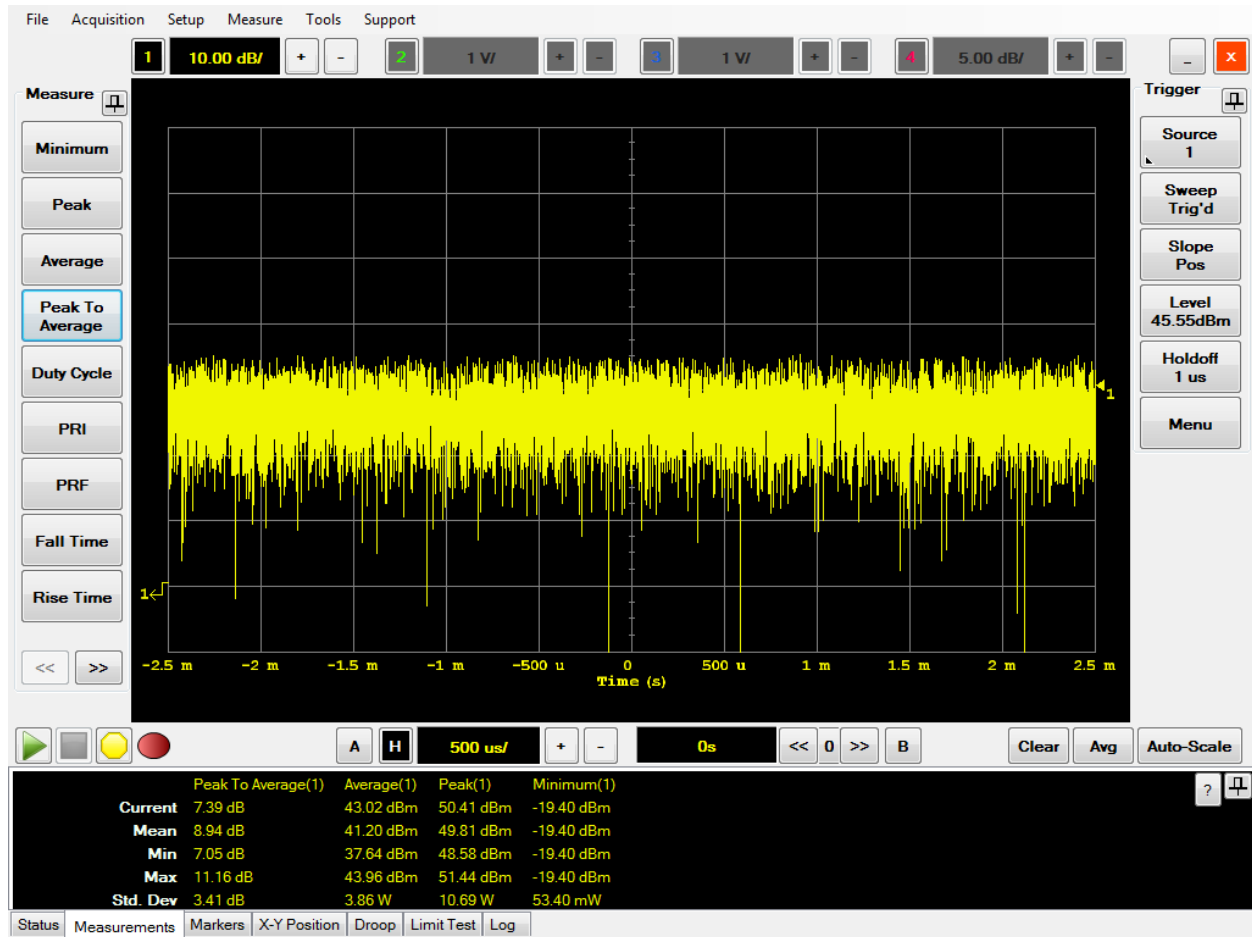
QPSK\16QAM\64QAM (10+10 MHz Non-Contiguous)



QPSK\16QAM (10 MHz)



64QAM (10 MHz)



4.2 Section 2.1047 MEASUREMENT REQUIRED: MODULATION CHARACTERISTICS

The EUT supports LTE technology only. The LTE utilizes Orthogonal Frequency Division Multiplexing (OFDM) which splits the carrier frequency bandwidth into many small subcarriers. Each individual subcarrier is modulated with QPSK/6QAM and 64QAM digital modulation formats.

In QPSK, there are 4 possible symbol states and each symbol carries 2 bits of information. In 16QAM, there are 16 possible symbol states and each 16-QAM symbol carries 4 bits of information. While in 64QAM, there are 64 possible symbol states and each 64-QAM symbol carries 6 bits of information. Higher-order modulation, where the constellations become more dense, is more sensitive to poor channel conditions than the lower-order modulation.

The modulation characteristics measurement of LTE carriers measures the difference between the ideal symbols and the measured symbols after the equalization. The measurement was performed for QPSK, 16QAM and 64QAM, respectively, where the carrier power level was adjusted to the maximum rated mean power at the antenna terminal.

4.2.1 Modulation Characteristics Measurement

The measurements were performed at the antenna transmitting terminal of the base station system with a signal analyzer which was calibrated in accordance with ISO 9001 process.

The test set-up diagram is given in the Figure 4.2.1, where the signal analyzer used the external signals from the base station as its trigger source and time reference.

Figure 4.2.2 shows screen plots of the modulation measurement for an LTE carrier in QPSK/16QAM and 64QAM modulations, respectively.

4.2.1.1 Modulation Measurements Results:

The modulation characteristics of the EUT measured are in full compliance with the Rules of the Commission.

Figure 4.2.1 Test Set-Up for Measurement of Modulation Characteristics, Occupied Bandwidth and Out-of-Band Emissions

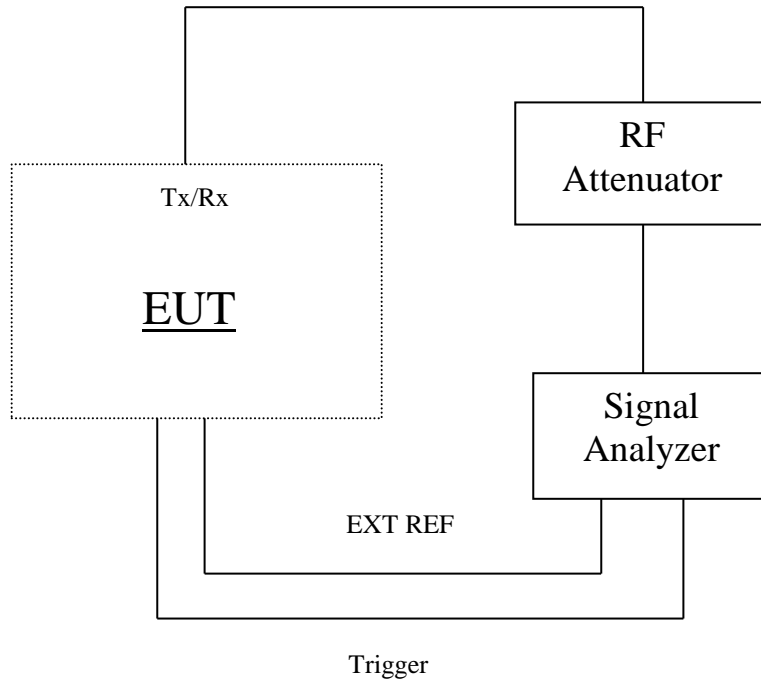
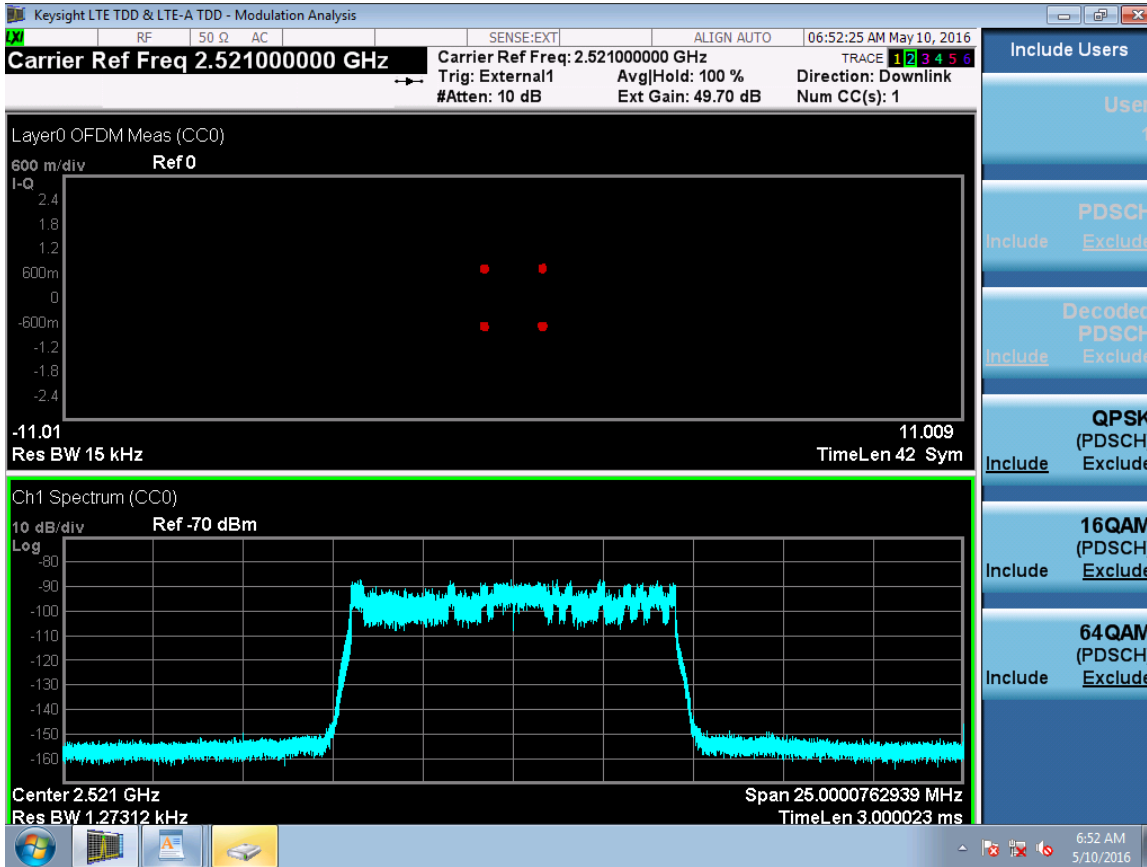
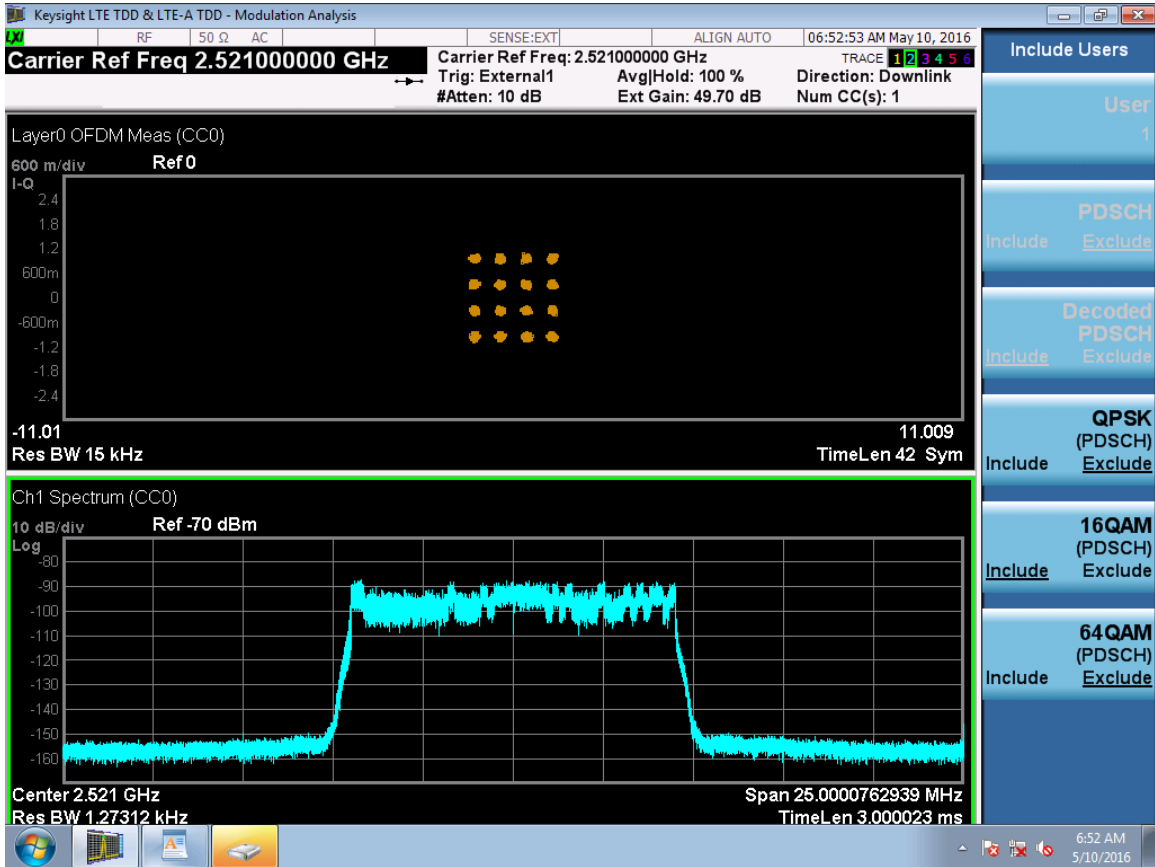
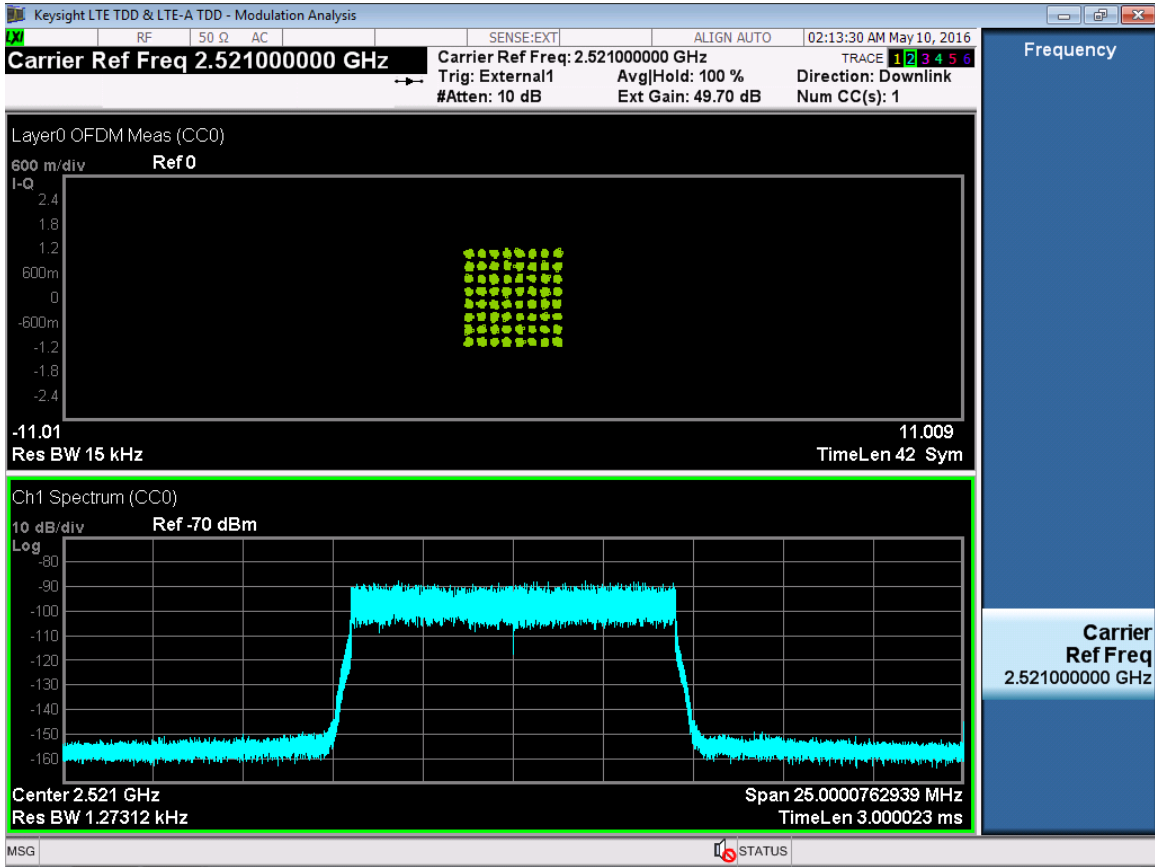


FIGURE 4.2.2 Modulation Measurement for a 10 MHz LTE Carrier at 2521 MHz with QPSK/16QAM AND 64QAM Modulations







4.3 Section 2.1049 MEASUREMENT REQUIRED: OCCUPIED BANDWIDTH AND OUT-OF-BAND EMISSIONS

This test measures the Occupied Bandwidth of the transmitting carrier and the Out of Band Emissions in the frequency spectrum immediately outside and adjacent to the transmitting carrier(s).

The occupied bandwidth (OBW) is usually defined either as the 99% power OBW or a relative OBW. The 99% OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated or conducted are each equal to 0.5 percent of the total mean power radiated or conducted by a given emission. The relative OBW is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated by at least X dB below the transmitter power, where the value of X is typically specified as 26.

Per KDB 971168 D01 v02r02, the relative OBW must be measured and reported when it is specified in the applicable rule part; otherwise, the 99% OBW shall be measured and reported. The OBW shall be measured when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment is operated.

4.3.1 Measurement of Occupied Bandwidth

The operating blocks and carrier configurations supported are provided in Section 3.1 Product Descriptions. The EUT transmitting band for wireless communication is governed by the FCC rules in CFR 47, Part 27. The minimum emission requirements and the setting of measurement equipment for the out-of-band emissions measurement of carriers were specified in FCC Part 27.53. The FCC’s requirements are tabulated in the following table:

Table 4.3.1 FCC Part 27.53 Transmitter Unwanted Emission Limits

Frequency	Required Minimum Attenuation below the Mean Carrier Power <i>P</i>	Resolution Bandwidth of Spectrum Analyzer
100 kHz Bands Immediately Outside the Transmitting Frequency Band	(43 + P dBW) dBc = -13dBm*	100kHz for 10 & 20MHz carrier
Outside the above Frequency Range	(43 + P dBW) dBc = -13dBm*	1MHz

*For NxMIMO, the limit is reduced by $10 \cdot \log(N)$ dB.

The reference line on the spectrum analyzer display corresponds to level measured by the RF power meter. Occupied Bandwidth plots were made at antenna terminals for an output of 20 watts (43 dBm) for 10MHz or 20MHz signal carrier, 10 watts (40dBm) watts/carrier for dual carriers and 6.6 watts/carrier (38.2 dBm) for 3 carriers.

Reference signal derived from GPS and frame trigger from the RRH were input into analyzer. This enables analyzer to measure power and occupied BW only during cycle of the transmitter providing accurate measurements. Reference, trigger and duty cycle wave forms are provided in Measurement: (2) Modulation characteristics (response to FCC Section 2.1047)

The frequencies and blocks used were tabulated on the bottom of each plot. The output signals at RF filter were plotted for first, middle and last channels of each frequency band. The TD-RRH8X20 (BC41) is capable of operating in the band of 2496 MHz to 2690MHz. The RRH presently tested was configured to operate at 10 or 20 MHz BW with contiguous and Non-contiguous carriers. Blocks and bands listed in Table below Plots were provided for composite carriers. These frequencies were chosen to show the occupied bandwidth in the blocks in the frequency band in which this radio can be operated. All tests were performed for QPSK, 16QAM and 64QAM modulations.

The occupied bandwidth and out-of-band emissions measurements were made at the antenna transmitting terminal for QPSK, 16QAM and 64QAM modulations, respectively. The appropriate E-UTRA test model specified in 3GPP TS 36.141 was used for LTE carriers.

The measurements were performed with a spectrum analyzer in compliance with the procedure and requirements of ANSI C63.26. The test set-up diagram is same as the one shown in the Figure 4.3.1.

The 26dB occupied bandwidth measurement of an LTE carrier was measured per FCC KDB 971168. For the out-of-band emissions measurement, the spectrum analyzer was set with a resolution bandwidth which is equal to at least 1% of carrier bandwidth and a video bandwidth which is equal to at least 3xRBW as shown in the plots of the occupied bandwidth measurement attached in the following pages. The emissions outside the above spans were evaluated in Measurement Required: Out-of-block Spurious Conducted Emissions. The top of the carrier measured with a resolution bandwidth which is equal to 1% of carrier bandwidth was 20 dB below the LTE carrier power measured with a resolution bandwidth greater than the carrier bandwidth (if available) or a wideband power meter. This 20dB offset was due to the fact that $10 \log (BW/1\% *BW) = 20 \text{ dB}$. The RMS average detector was used in all above measurements. The measurement met the requirements of ANSI C63.26 paragraphs 5.2.4.4.1 and 5.7 which require that the number of points in the sweep be $> 2 \times \text{Span}/\text{RBW}$.

For multiple carriers, the measurements were made at the antenna terminal for various configurations from adjacent channels to farthest separated channels across the operating band. The measurement was performed for QPSK, 16QAM and 64QAM modulations, respectively. The total carrier power level at the antenna terminal was adjusted to the maximum rated mean power +43dBm (20W) per port.

The following channels are measured:

Table 4.3.2 (a) Channels Tested for Occupied Bandwidth and Out-of-Band Emissions

Tx1 Frequency (MHz)	Tx2 Frequency (MHz)	Tx3 Frequency (MHz)	Contiguous/Non-Contiguous	Bandwidth (MHz)	Modulations
2496 - 2690			Contiguous	10	QPSK/16QAM 64QAM
2496 - 2506	2506 - 2516		Contiguous	10 + 10	QPSK/16QAM 64QAM
2630 - 2640	2680 - 2690		Non-Contiguous	10 + 10	QPSK/16QAM 64QAM
2496 - 2506	2506 - 2516	2516 - 2526	Contiguous	10 +10 +10	QPSK/16QAM 64QAM
2640 - 2650	2660 - 2670	2680 - 2690	Non-Contiguous	10 +10 +10	QPSK/16QAM 64QAM
2496 - 2516	2516 - 2526	2526 - 2536	Contiguous	20 +10 +10	QPSK/16QAM 64QAM
2630 - 2650	2660 - 2670	2680 - 2690	Non-Contiguous	20 +10 +10	QPSK/16QAM 64QAM

4.3.1.1 Mask Parameters

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

(b) **FCC Section 27.53 (m) (v) (6): Measurement procedure.** Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Pursuant to FCC OET RULES 662911 D01 and D02 for Eight antenna MIMO mode of operations, the FCC limit of -13dBm shall be 9dB more stringent, therefore all channel edge and out of band spurious emissions shall be -22dBm. Further limits are adjusted for lower resolution BW using $10 \log(200\text{kHz}/1\% \text{ of channel BW})$.

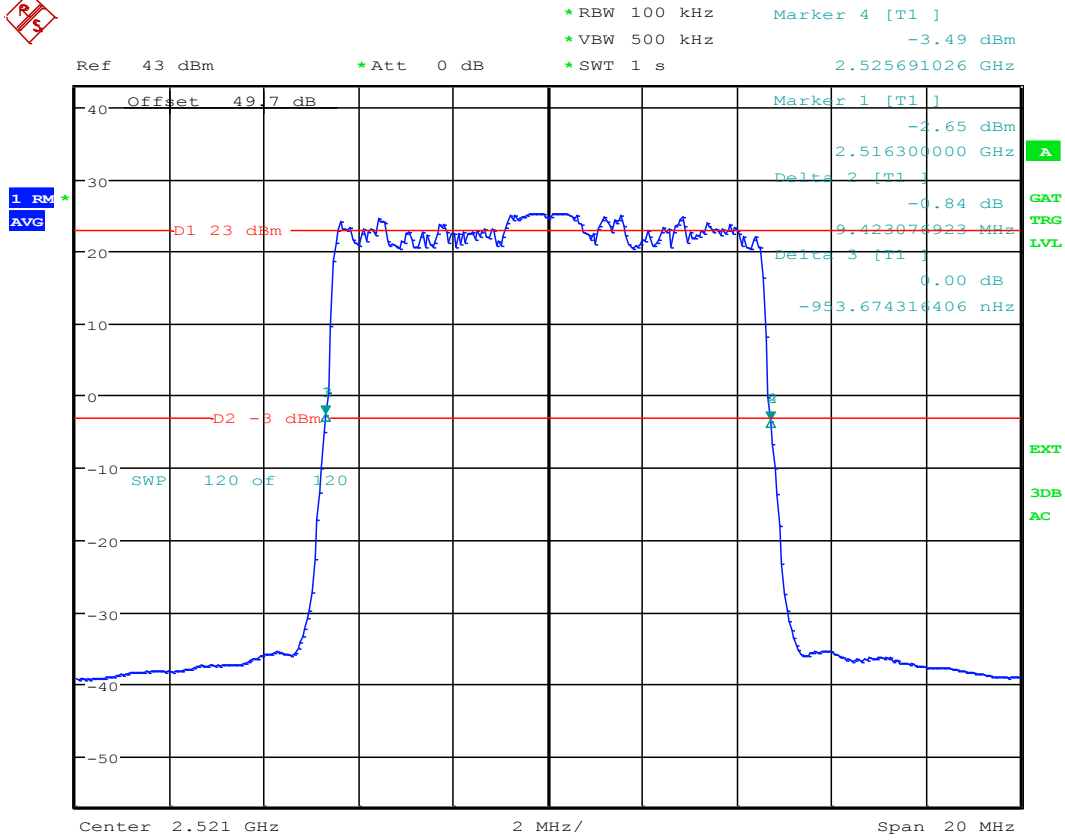
4.3.2 Results:

The occupied bandwidth plots which gave the widest occupied bandwidth for each bandwidth with QPSK/16QAM and 64 QAM were submitted, respectively. The limits specified in FCC Part 27.53 are displayed in the plots where 9dB margin for 8x8 MIMO is included.

From the out-of-band emissions plots attached below, it can be seen that all the emissions are under the required FCC emission masks for MIMO operation.

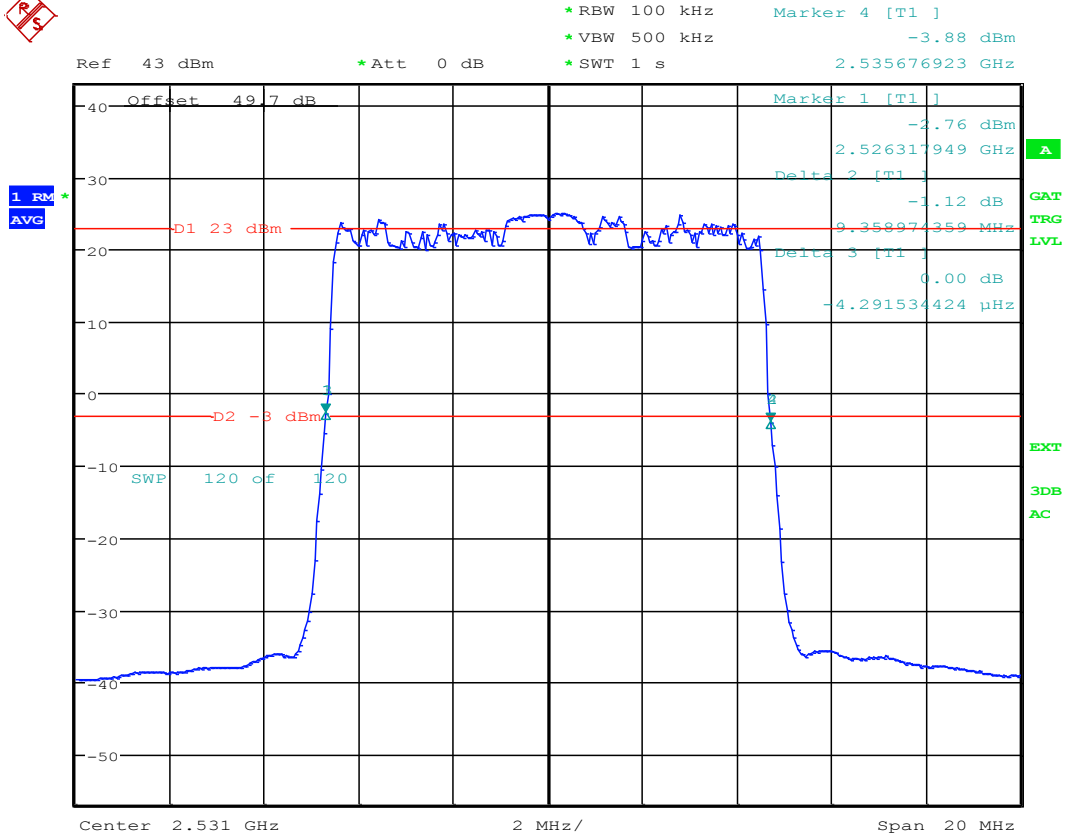
The measurement results of the occupied bandwidth and the out-of-band emissions demonstrate the full compliance with the Rules of the Commission for the operating band.

FIGURE 4.3.1
26 dB BANDWIDTH PLOTS



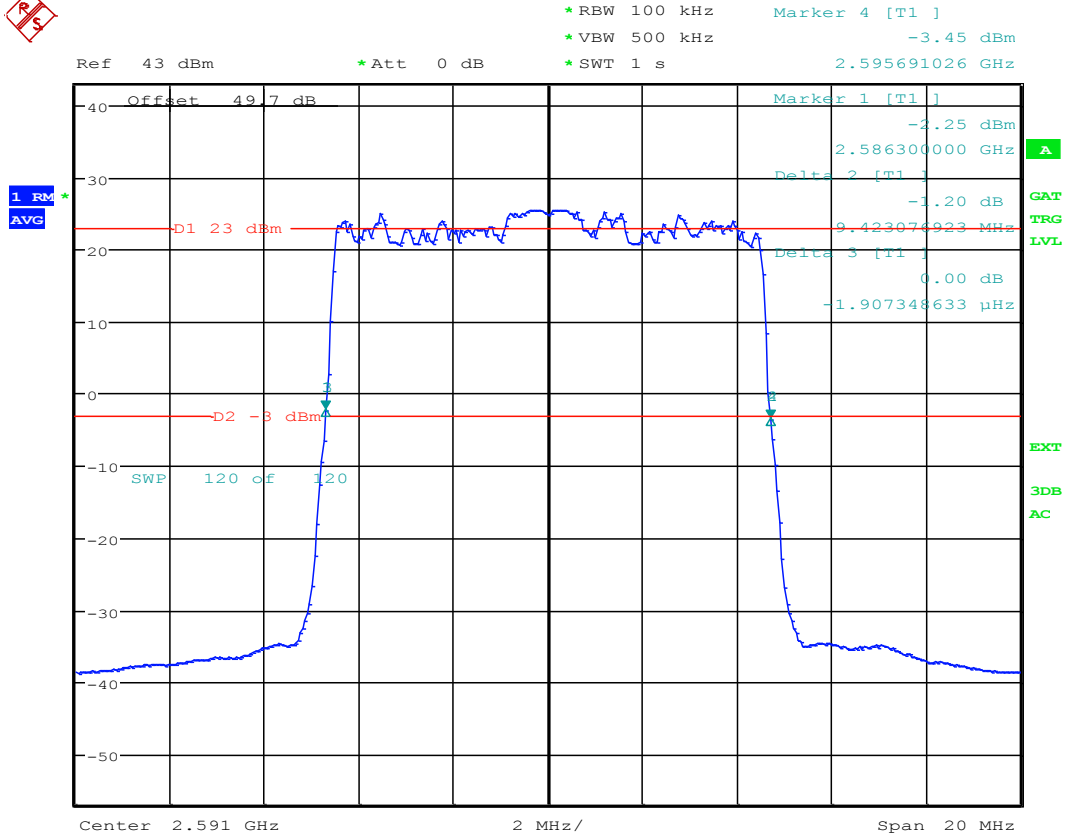
26dB BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 10.MAY.2016 09:46:09

FCCID: AS5BBTRX-15



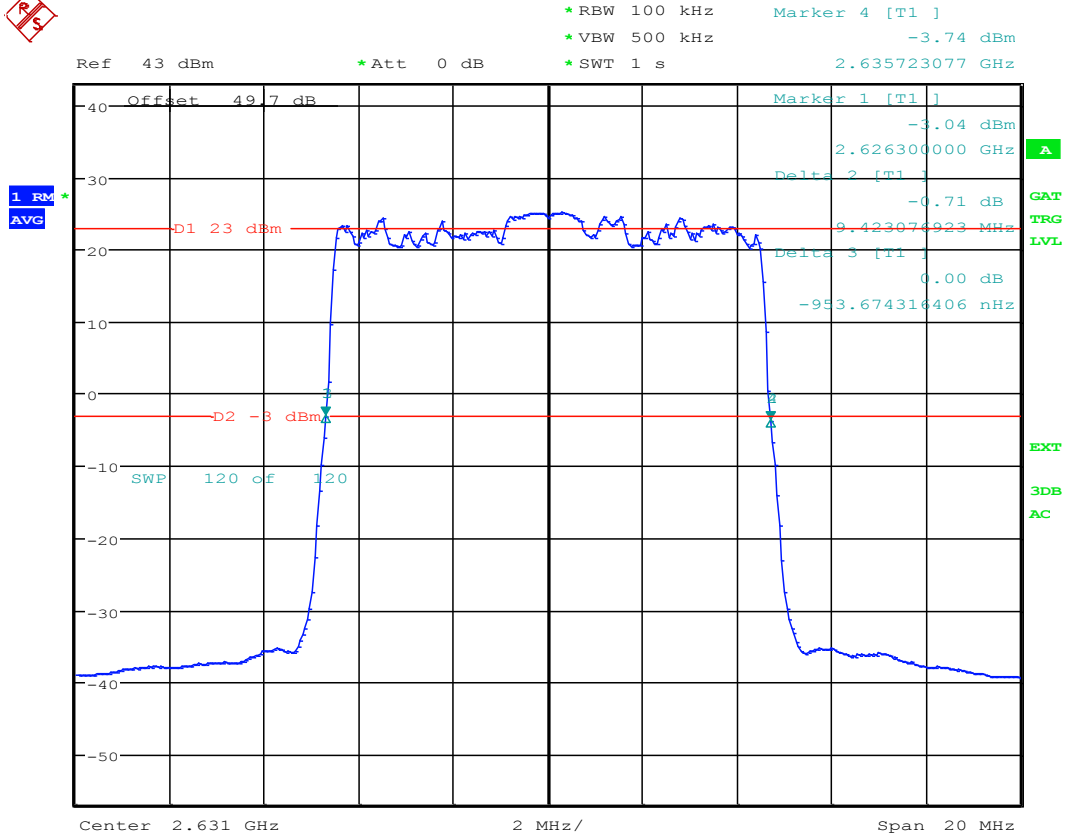
26dB BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 10.MAY.2016 11:49:01

FCCID: AS5BBTRX-15



26dB BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 16.MAY.2016 14:06:14

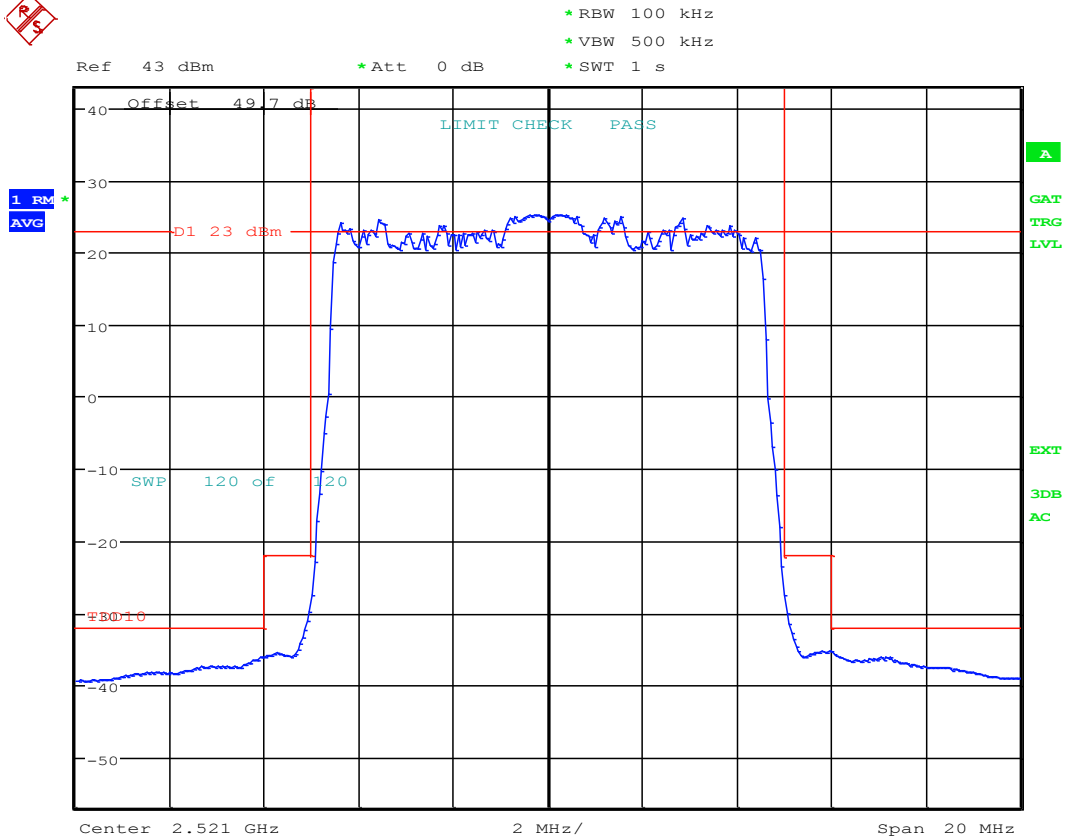
FCCID: AS5BBTRX-15



26dB BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 18.MAY.2016 13:18:24

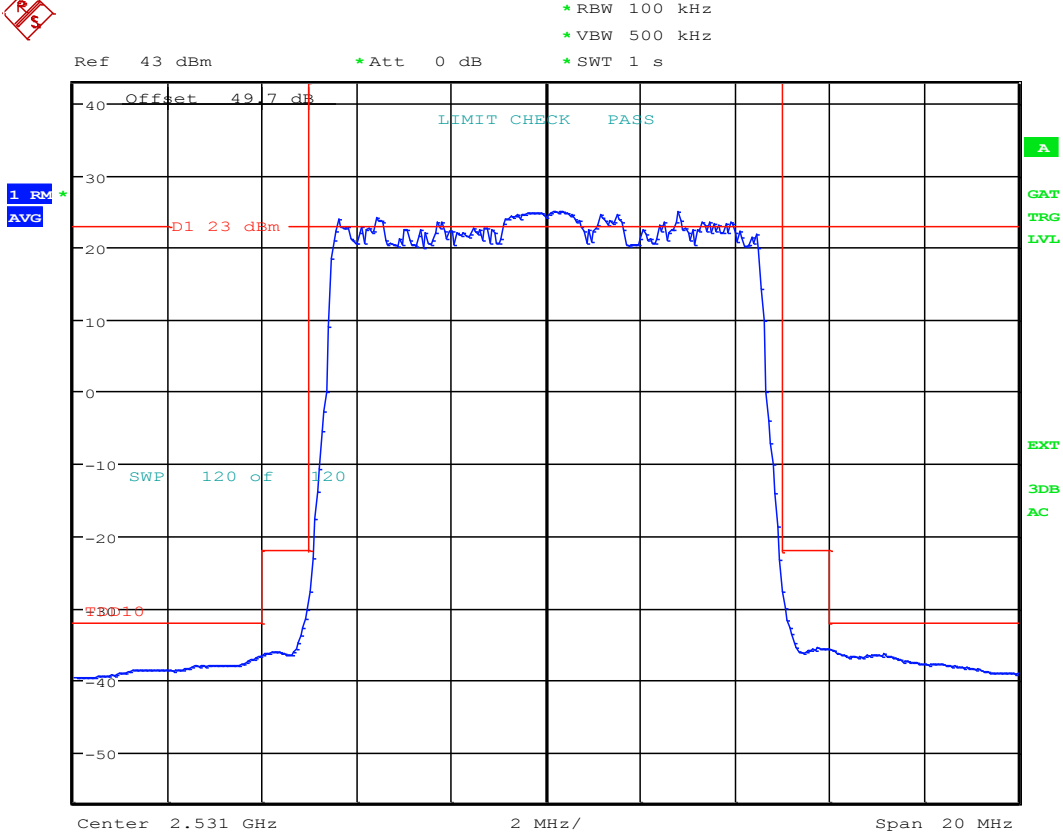
FCCID: AS5BBTRX-15

FIGURE 4.3.2
OCCUPIED BANDWIDTH PLOTS



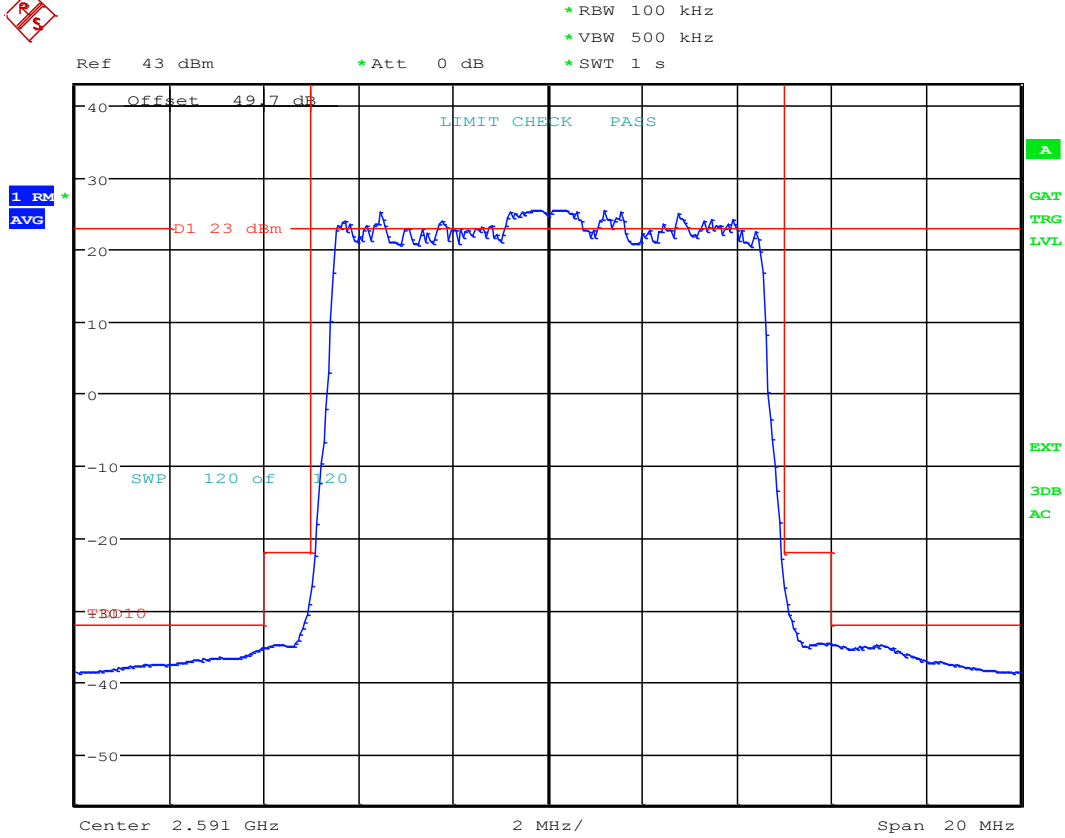
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 10.MAY.2016 10:28:37

FCCID: AS5BBTRX-15



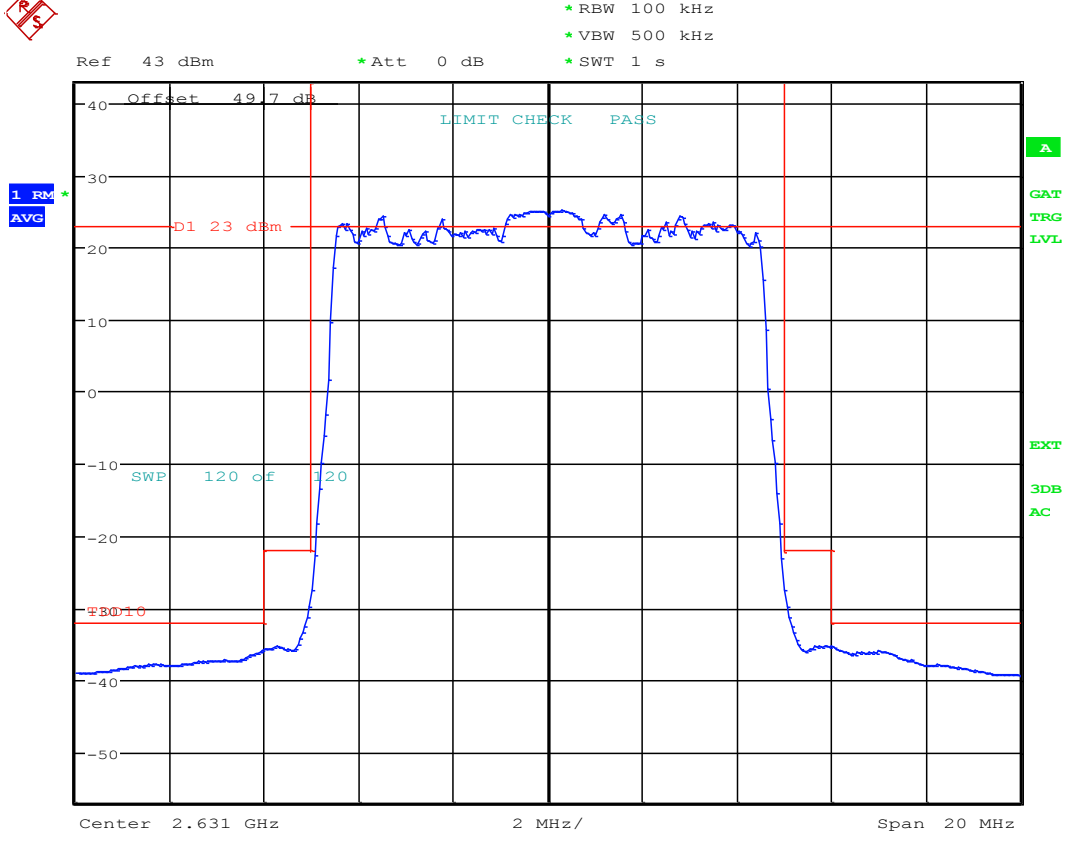
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 10.MAY.2016 11:47:55

FCCID: AS5BBTRX-15



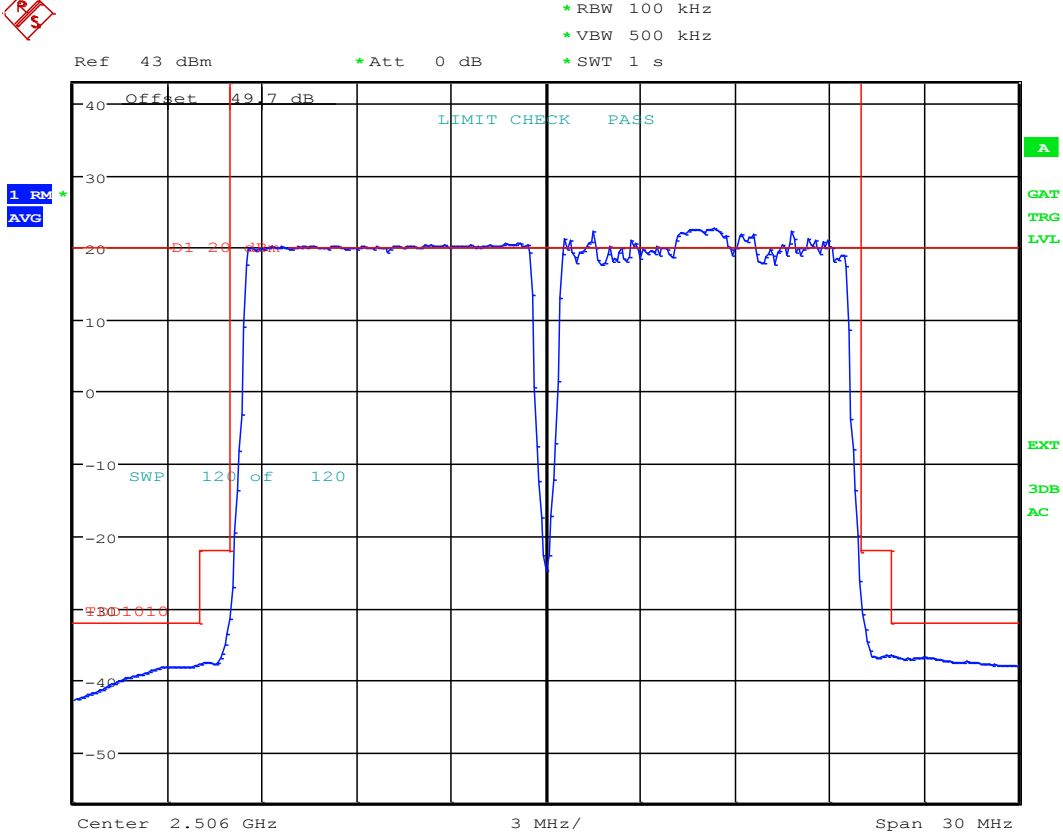
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 16.MAY.2016 14:04:02

FCCID: AS5BBTRX-15



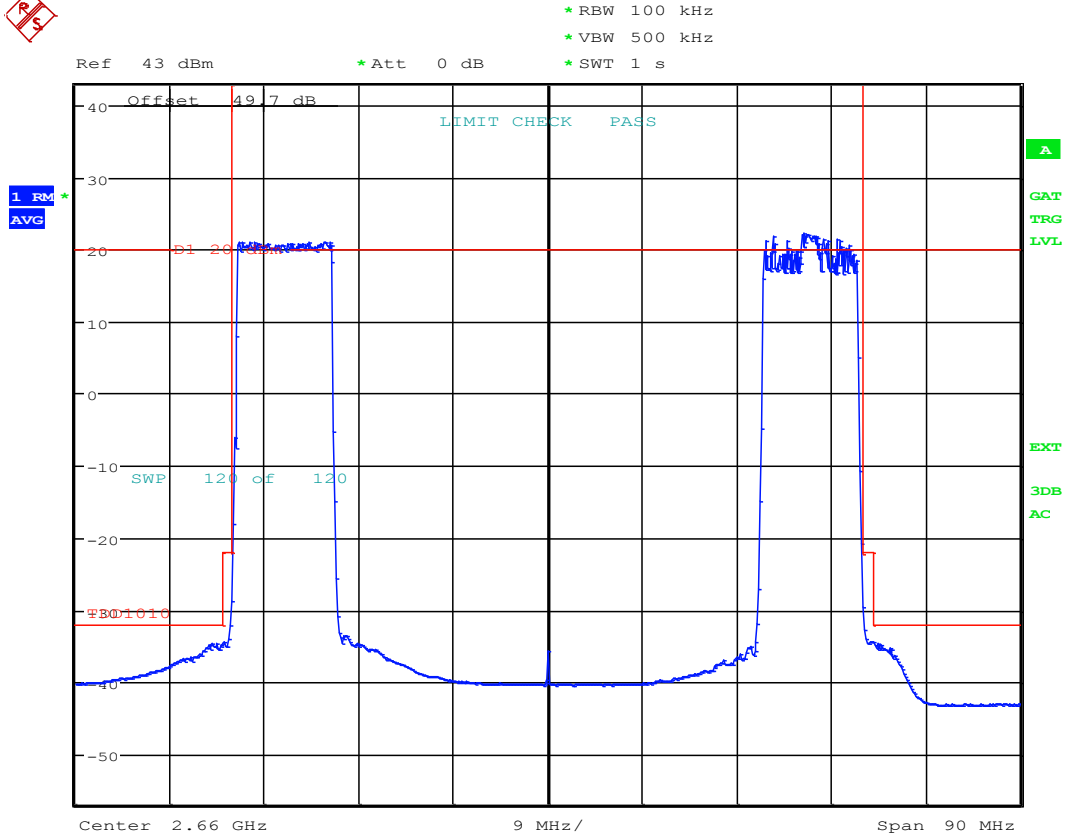
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10MHz BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A.CII
 Date: 18.MAY.2016 13:17:08

FCCID: AS5BBTRX-15



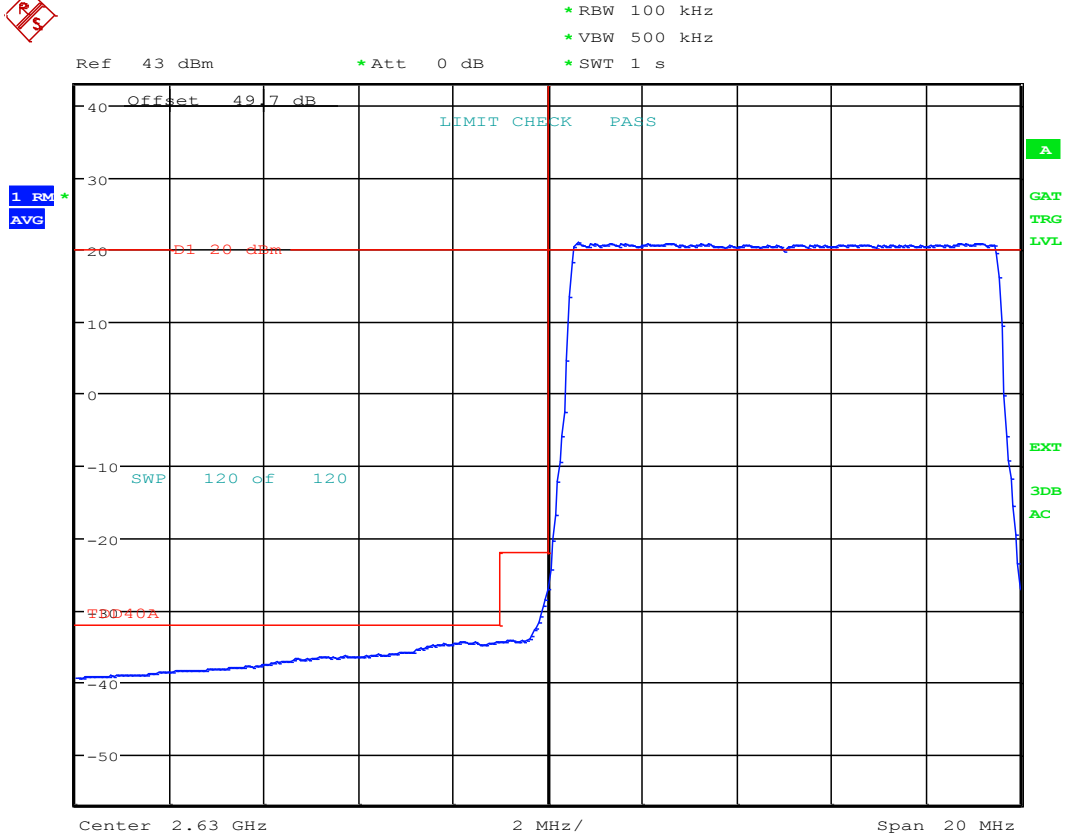
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20
 20W;10+10MHz BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-1
 5A.CII
 Date: 25.MAY.2016 09:16:56

FCCID: AS5BBTRX-15



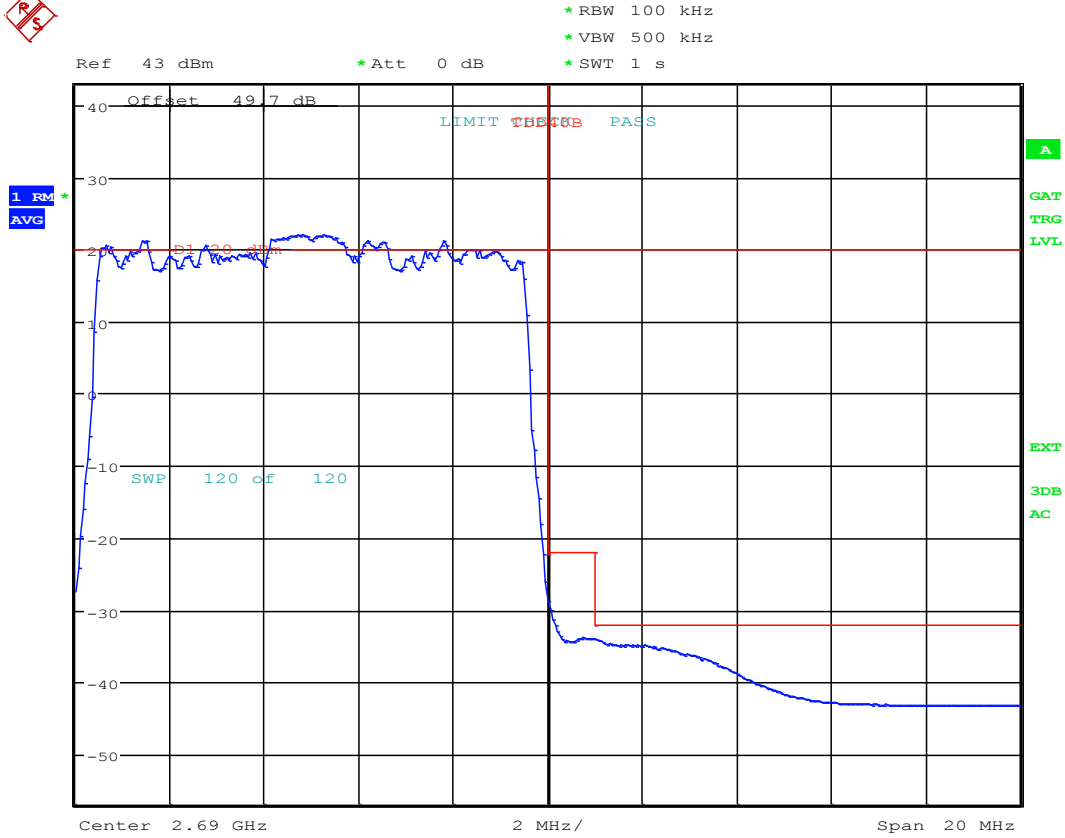
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10M BW;2635&2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 25.MAY.2016 13:38:11

FCCID: AS5BBTRX-15



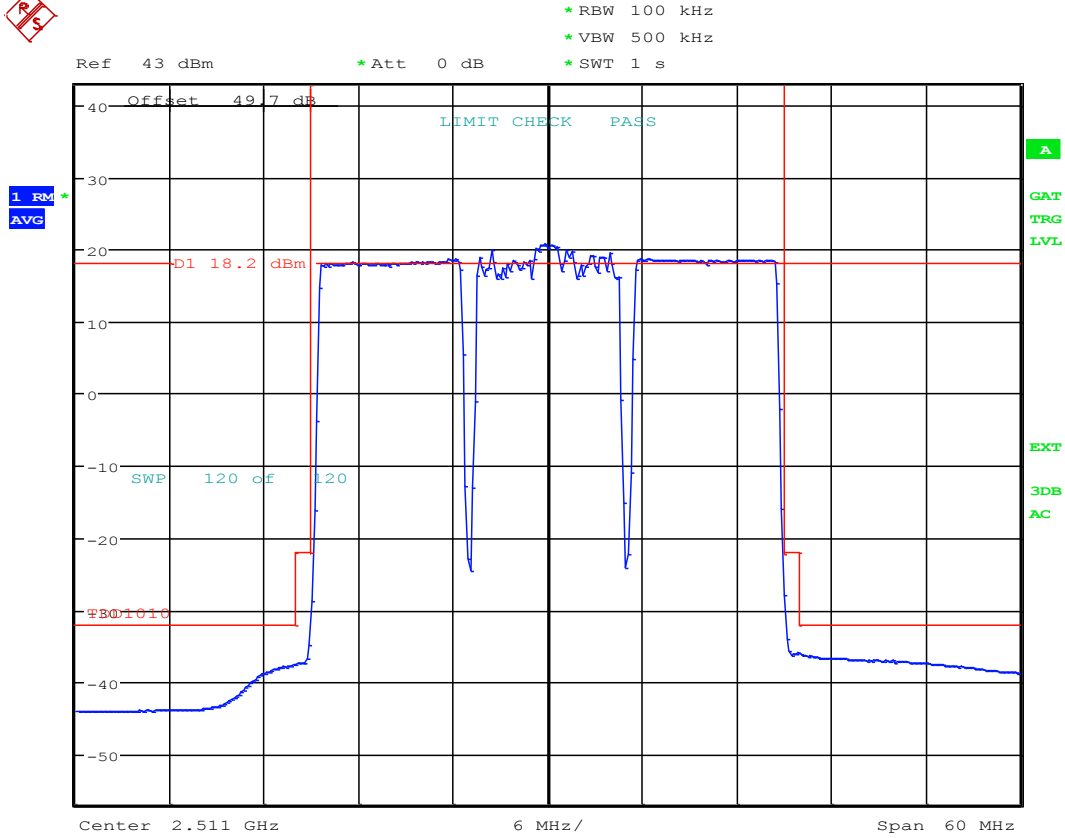
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10M BW;2635-2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 25.MAY.2016 14:30:12

FCCID: AS5BBTRX-15

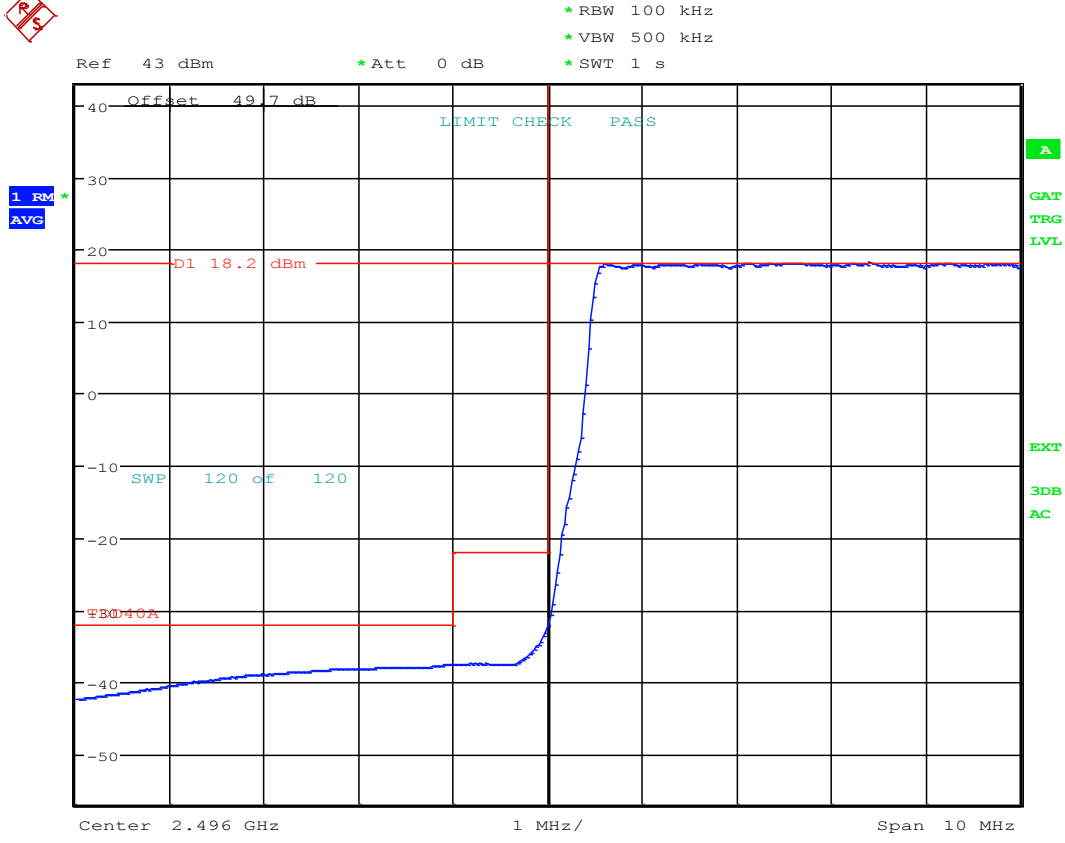


OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;0W
 10+10M BW;2635&2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 25.MAY.2016 13:54:57

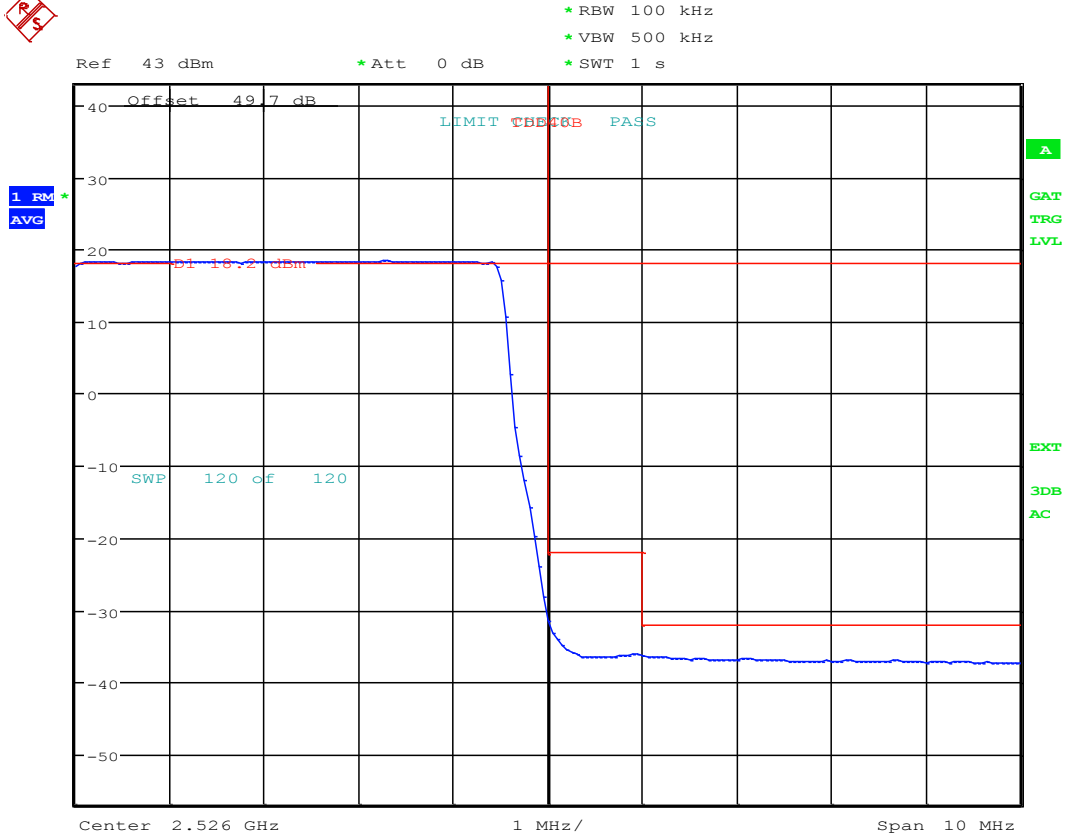
FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10+10MHz BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15
 A.CII
 Date: 26.MAY.2016 10:58:40
 FCCID: AS5BBTRX-15

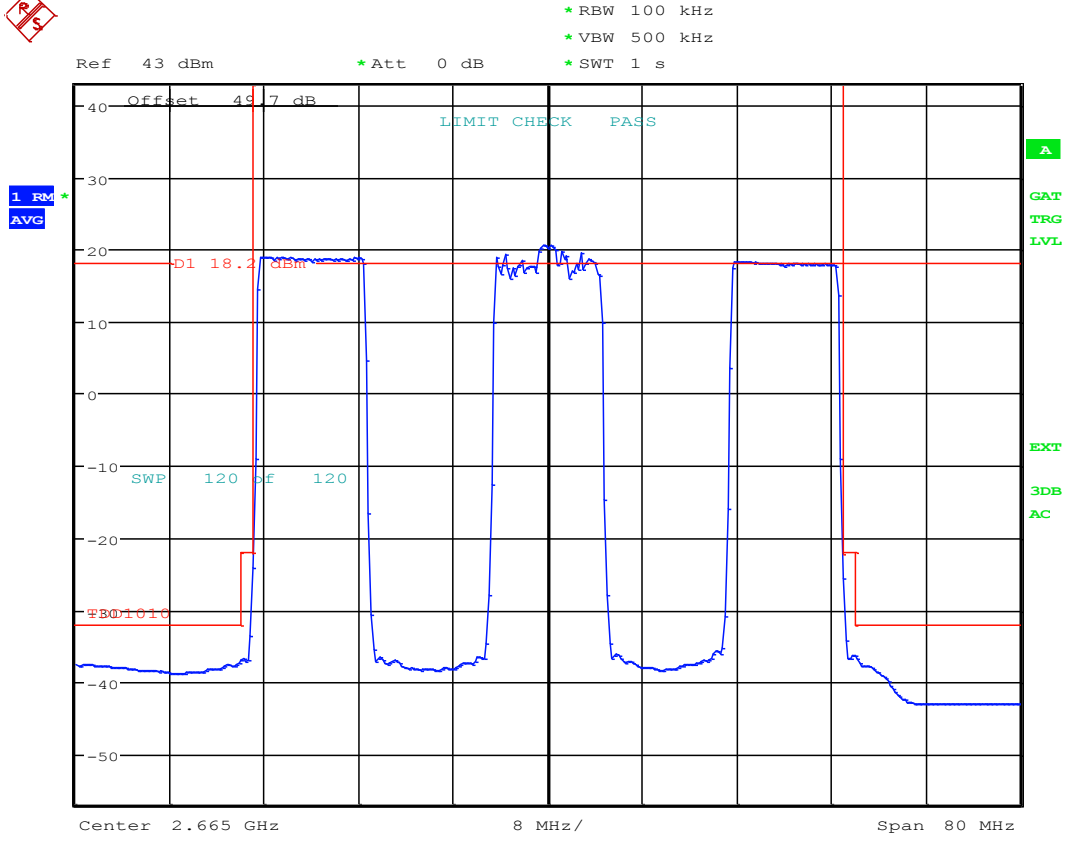


OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10+10MHz BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15
 A.CII
 Date: 26.MAY.2016 11:13:51
 FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 210+10+10MHz BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-1
 5A.CII
 Date: 25.MAY.2016 17:30:50

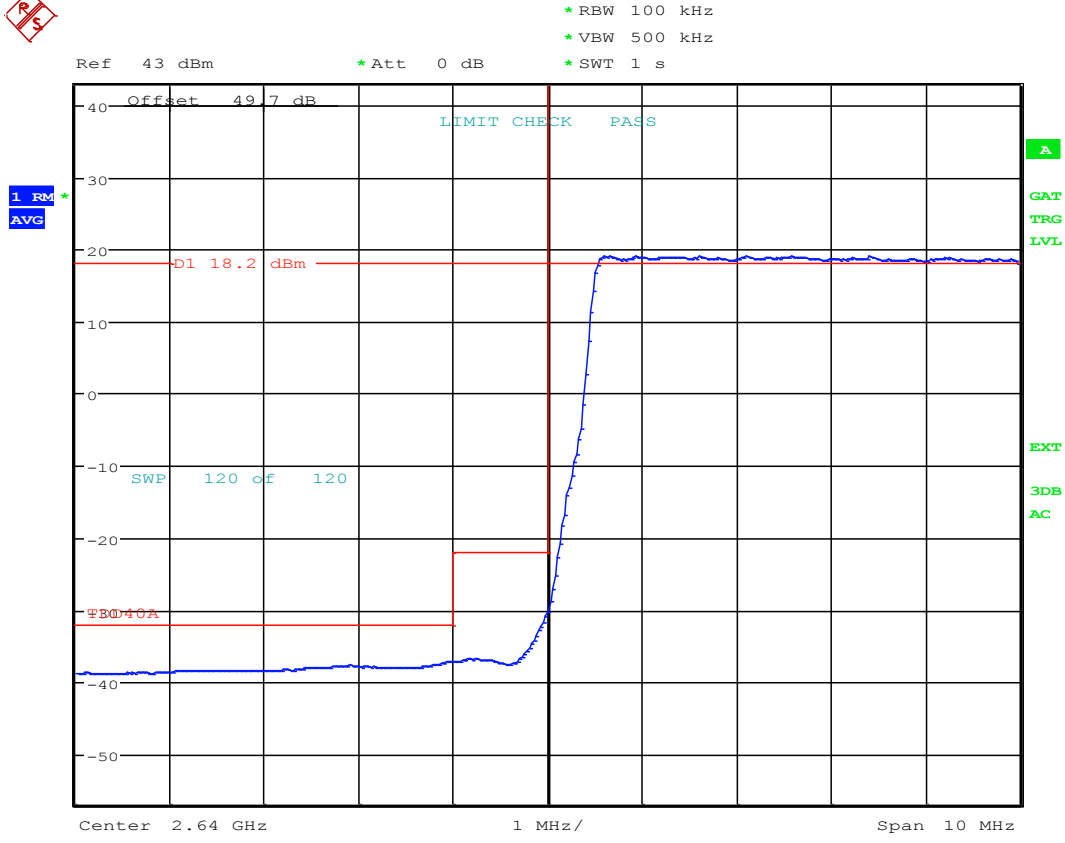
FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 26.MAY.2016 14:51:35

2645, 2665 and 2685MHz

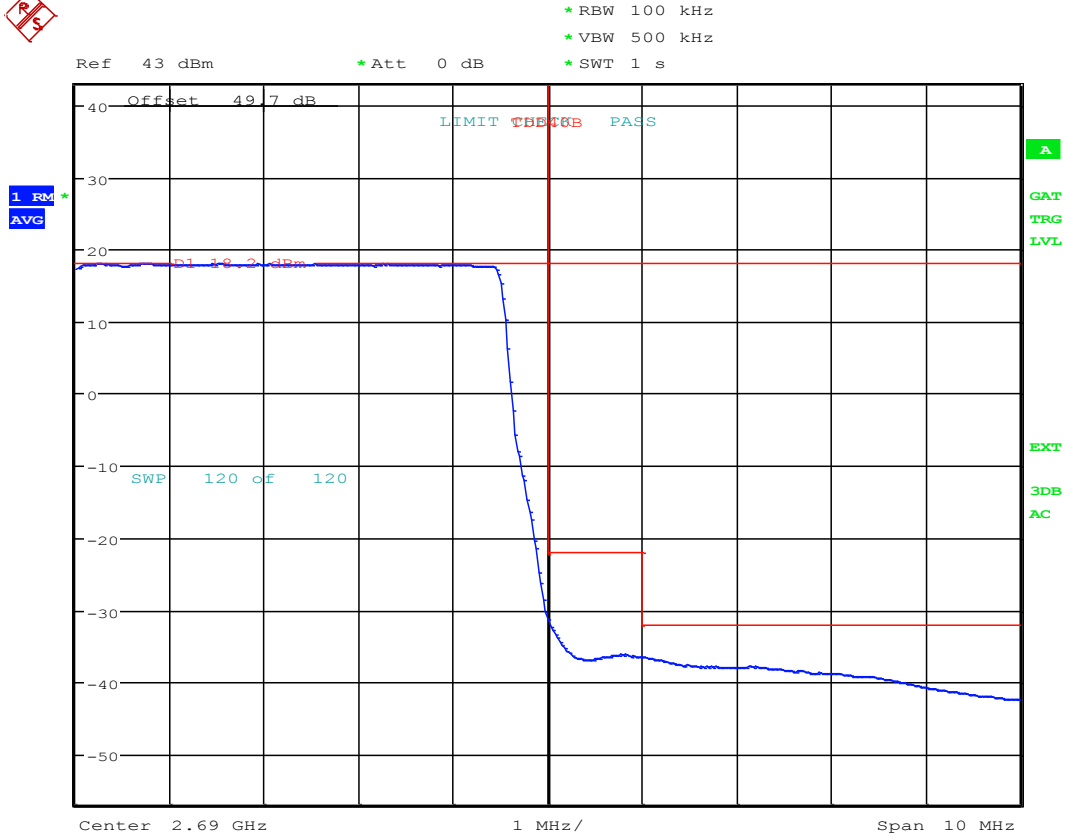
FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 26.MAY.2016 12:44:52

2645, 2665 and 2685MHz

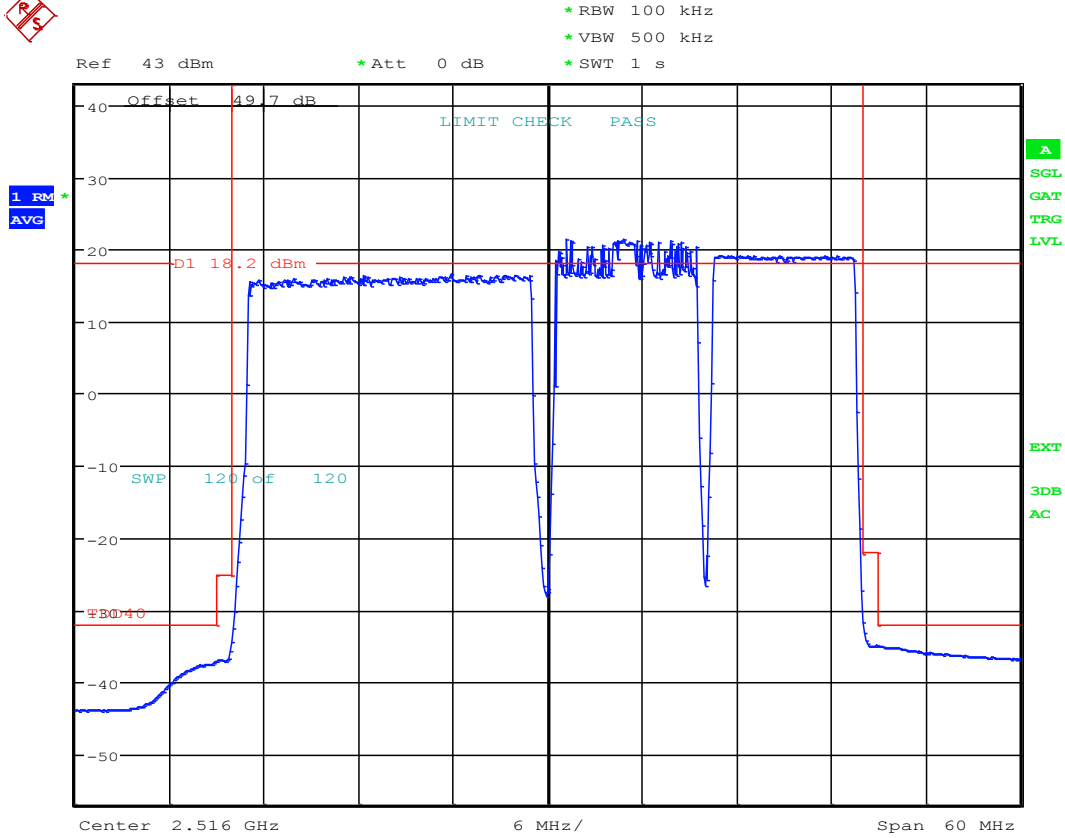
FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 10+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 26.MAY.2016 12:56:57

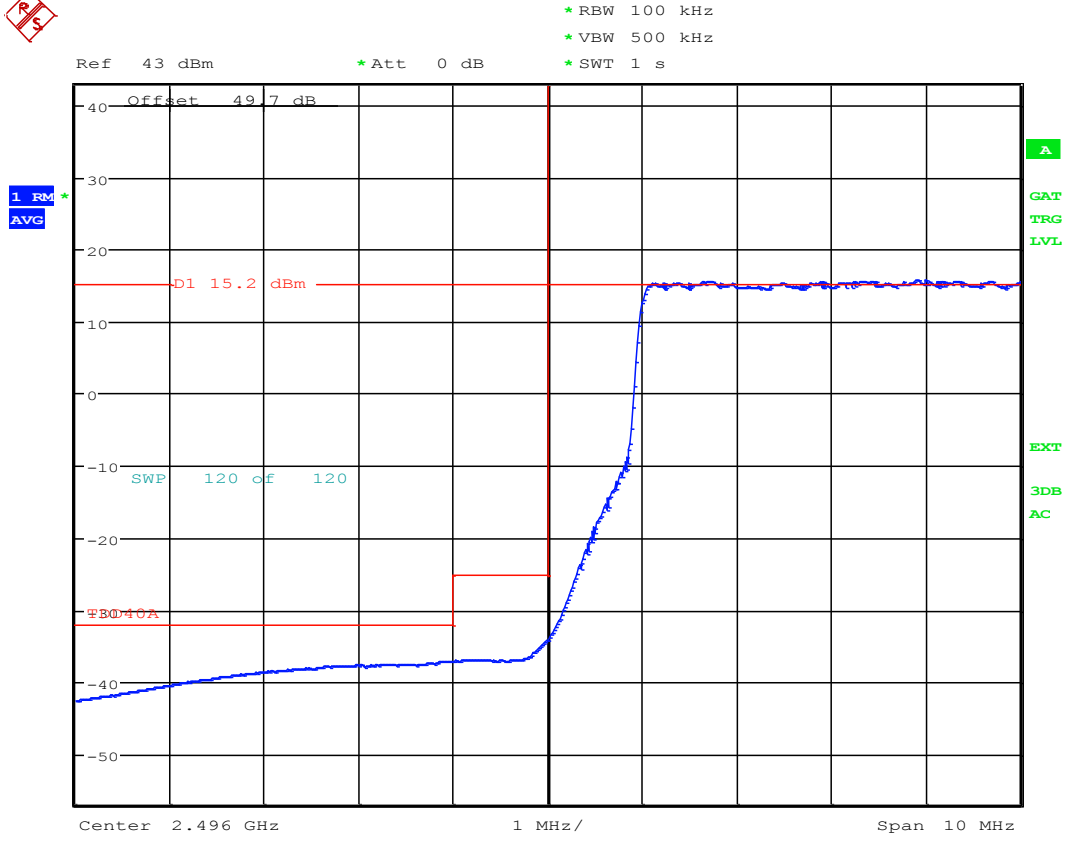
2645, 2665 and 2685MHz

FCCID: AS5BBTRX-15



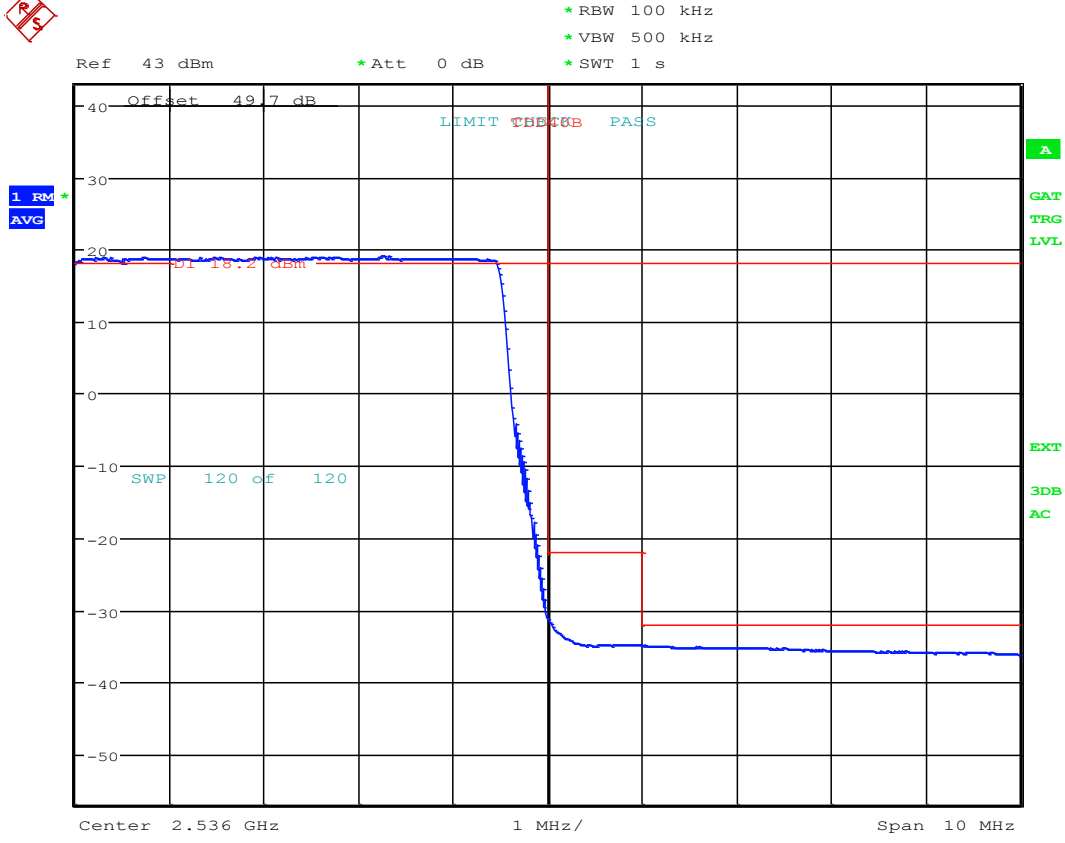
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 31.MAY.2016 10:19:27

FCCID: AS5BBTRX-15



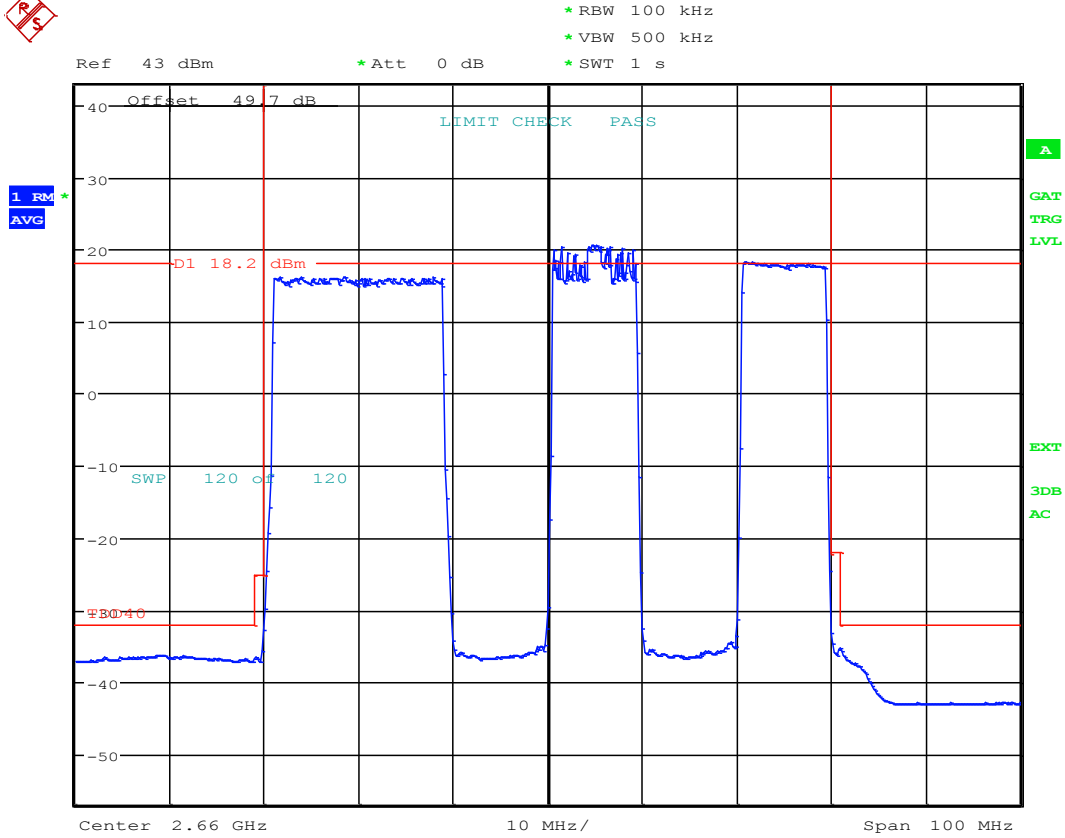
OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 20+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 26.MAY.2016 16:57:40

FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 20+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 26.MAY.2016 17:10:30

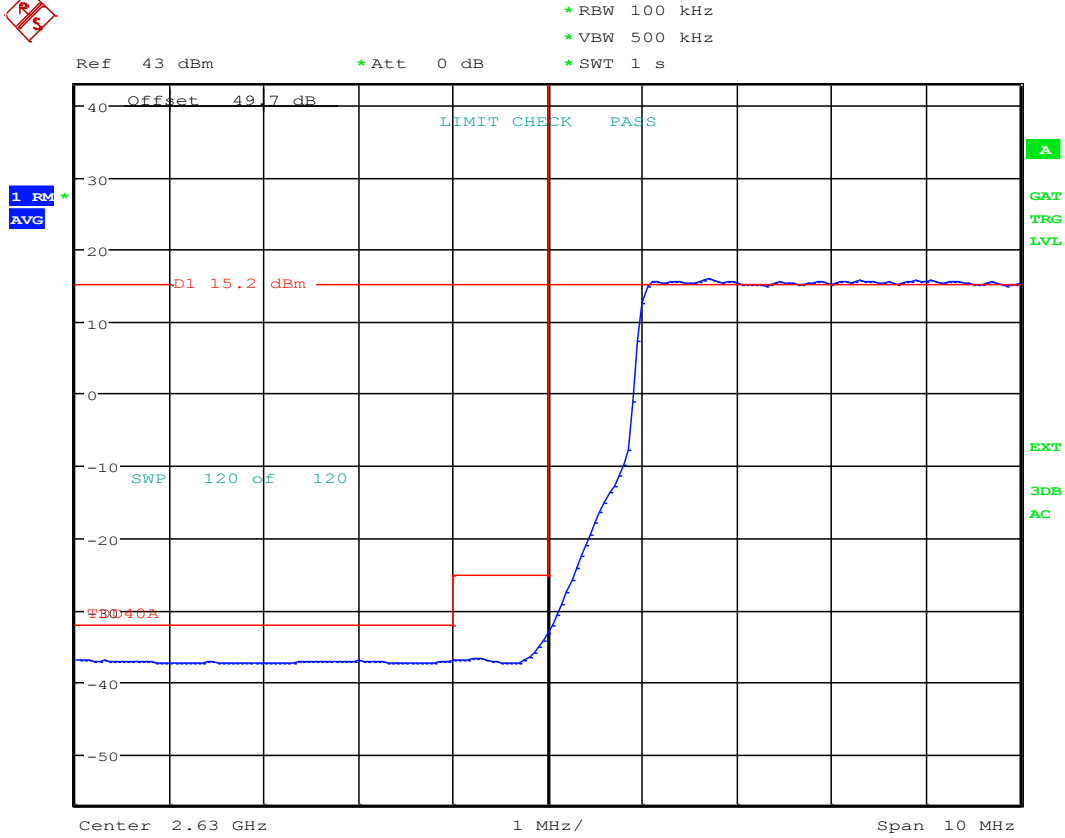
FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 20+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 27.MAY.2016 09:51:41

2635, 2665 and 2685 MHz

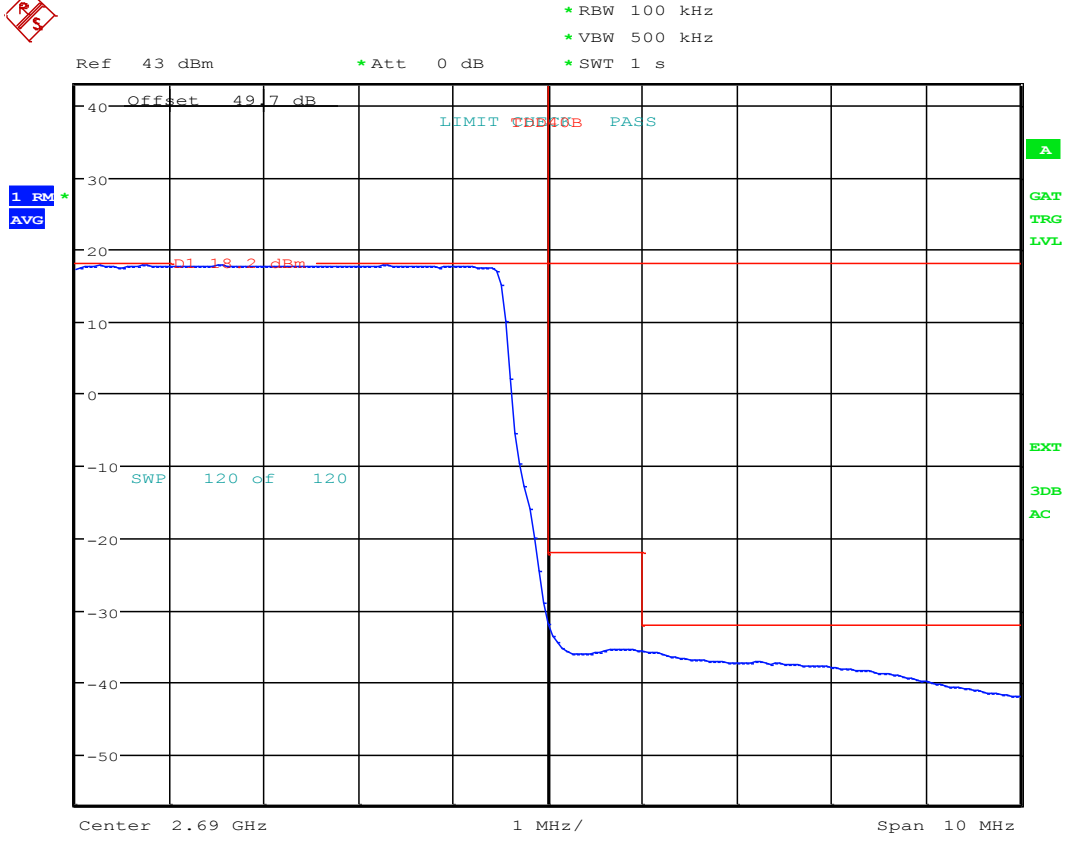
FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 20+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 27.MAY.2016 10:11:00

2635, 2665 and 2685 MHz

FCCID: AS5BBTRX-15



OCCUPIED BANDWIDTH:TEST ENG:JY;B41 TDD A RRH 8X20;20W
 20+10+10MHz BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A.CII
 Date: 27.MAY.2016 10:22:50

2635, 2665 and 2685 MHz

FCCID: AS5BBTRX-15

4.4 Section 2.1051 MEASUREMENT REQUIRED: SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

This test measures the emissions of spurious signals which may come from harmonic, parasitic, intermodulation and frequency conversion products and are outside the necessary bandwidth but exclude out-of-band emissions.

The out-of-block spurious emissions at the antenna transmitting terminal were investigated from 10 MHz to the 10th harmonic of the carrier, per Section 2.1057(a)(1).

The measurement configurations and carrier setup were the same as in Section 4.3. The emission limits and the setting of measurement equipment for the unwanted emissions measurement were given in Table 4.3.3 and provided in Table 4.4.1, where per FCC CFR 47, Sections 2.1051 and 2.1057(c), the spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

Table 4.4.1 Conducted Spurious Emissions Limit

Frequency of Emission (MHz)	Required Limit (2x2 MIMO) (dBm)	Reportable Limit (dBm)	Detector/RBW
10-27,000	-22	-36	Average/1MHz

The measurements were performed with a spectrum analyzer, which was calibrated in accordance with ISO 9001 process. The carrier power level at the antenna transmitting terminal was calibrated before the conducted spurious emissions testing for each test. The spectrum analyzer was set to a 1MHz resolution bandwidth. The RMS average detector was used.

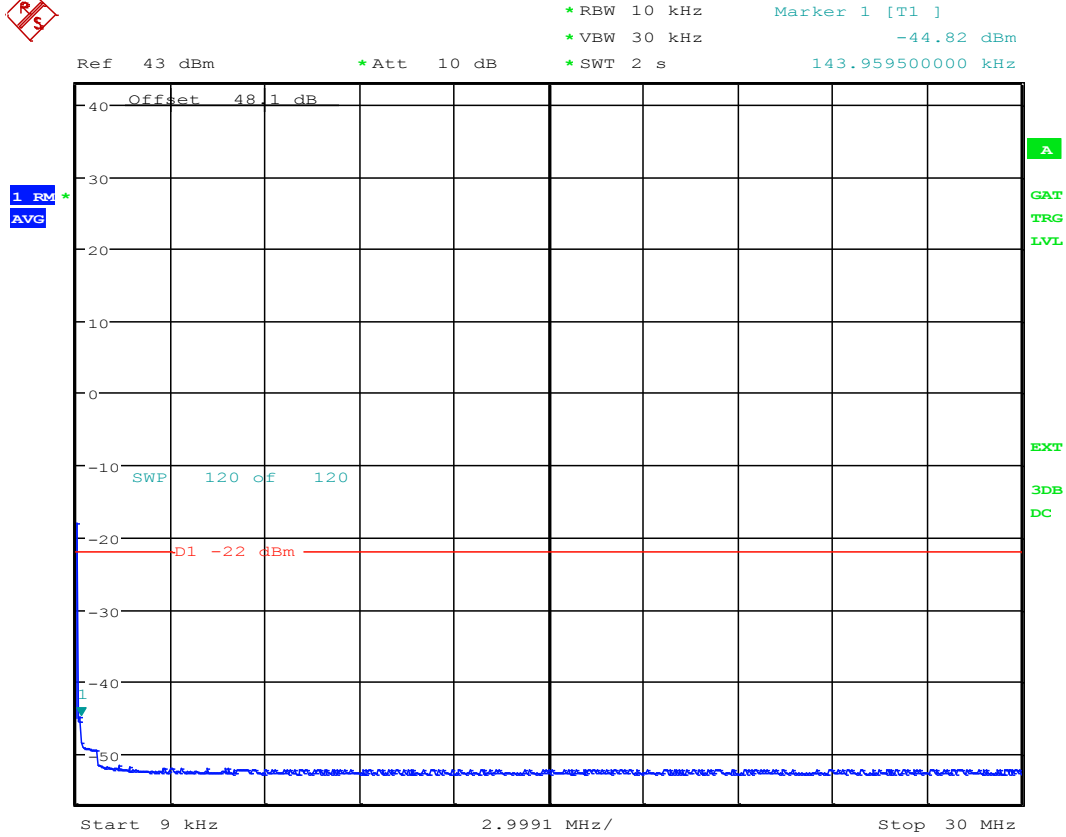
The measurement met the requirements of ANSI C63.26 paragraphs 5.2.4.4.1 and 5.7 which require that the number of points in the sweep be $> 2 \times \text{Span/RBW}$.

The spurious emissions in the frequency range measured are well under the required reportable emission limit for all carrier bandwidth with QPSK, 16QAM and 64QAM modulations evaluated. Therefore, there are no reportable emissions.

4.4.1 Results:

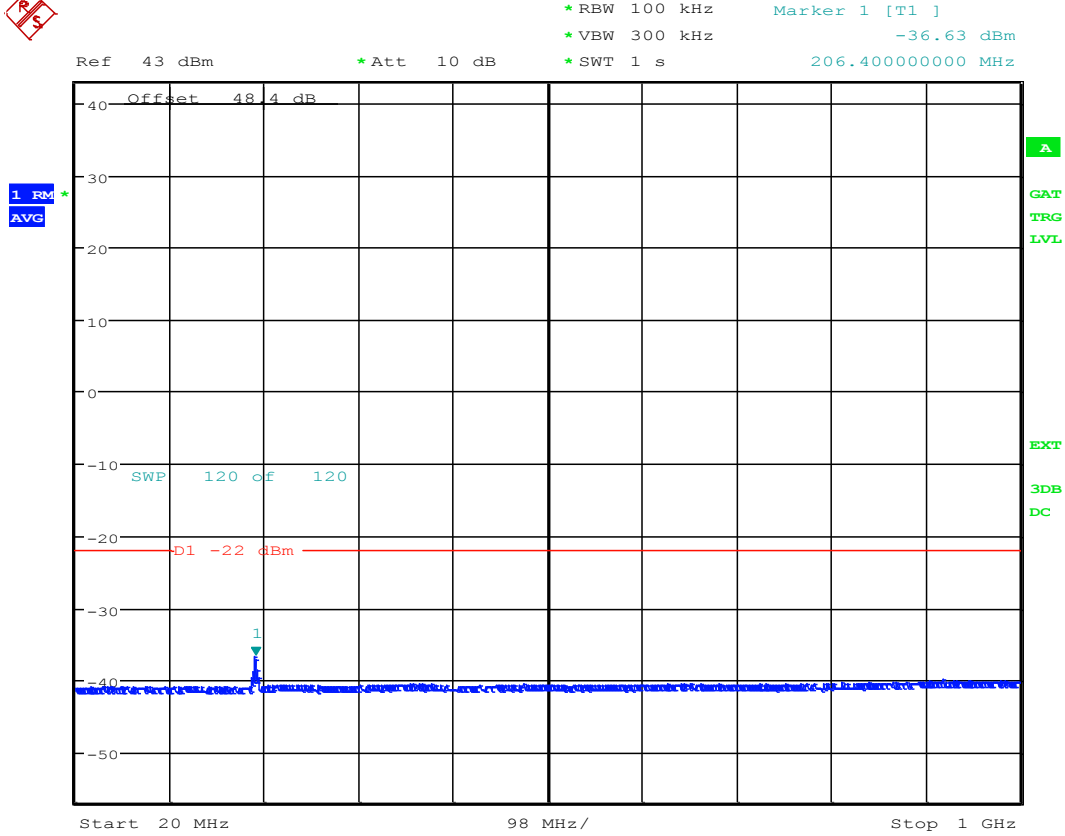
The worst case out-of-block spurious emissions in the entire spectrum investigated are reported on the plots below. The measurement results demonstrate that the subject of the application is in full compliance with the Rules of the Commission.

FIGURE 4.3.3
TX SPURIOUS EMISSIONS PLOTS
(WORST CASE DATA)



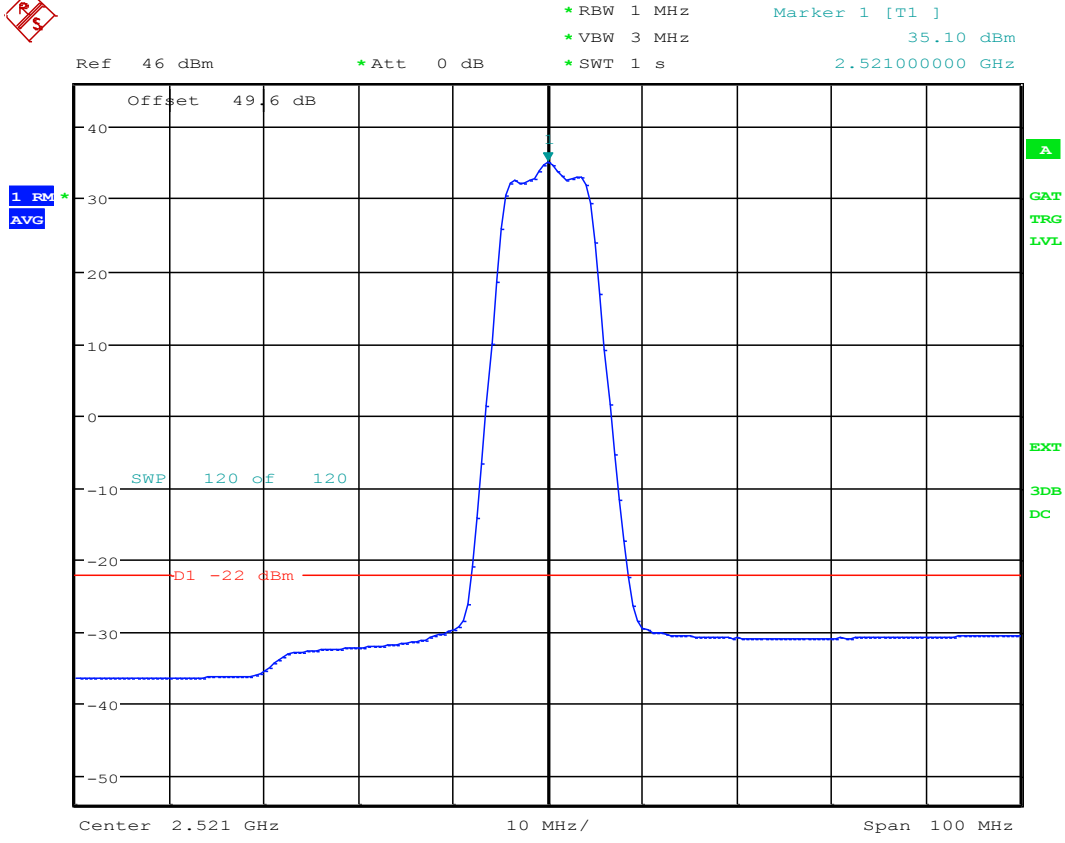
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A; CII
 Date: 10.MAY.2016 09:31:27

FCCID: AS5BBTRX-15



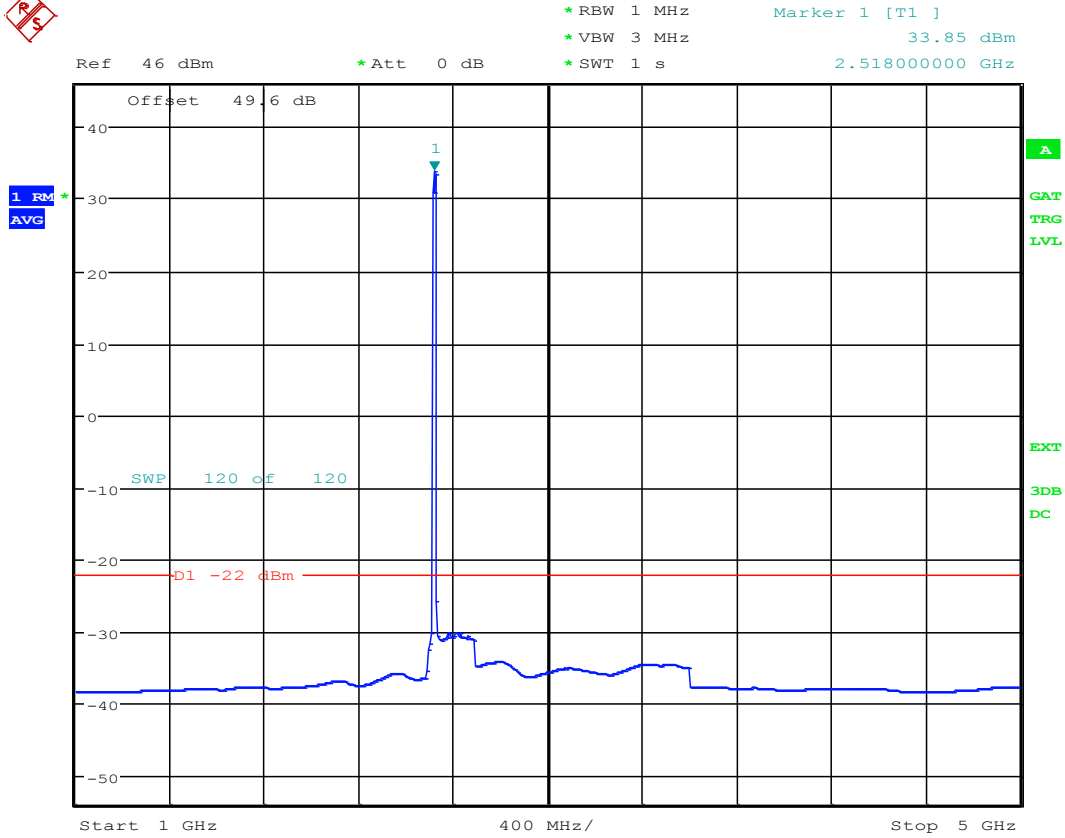
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 17:19:04

FCCID: AS5BBTRX-15



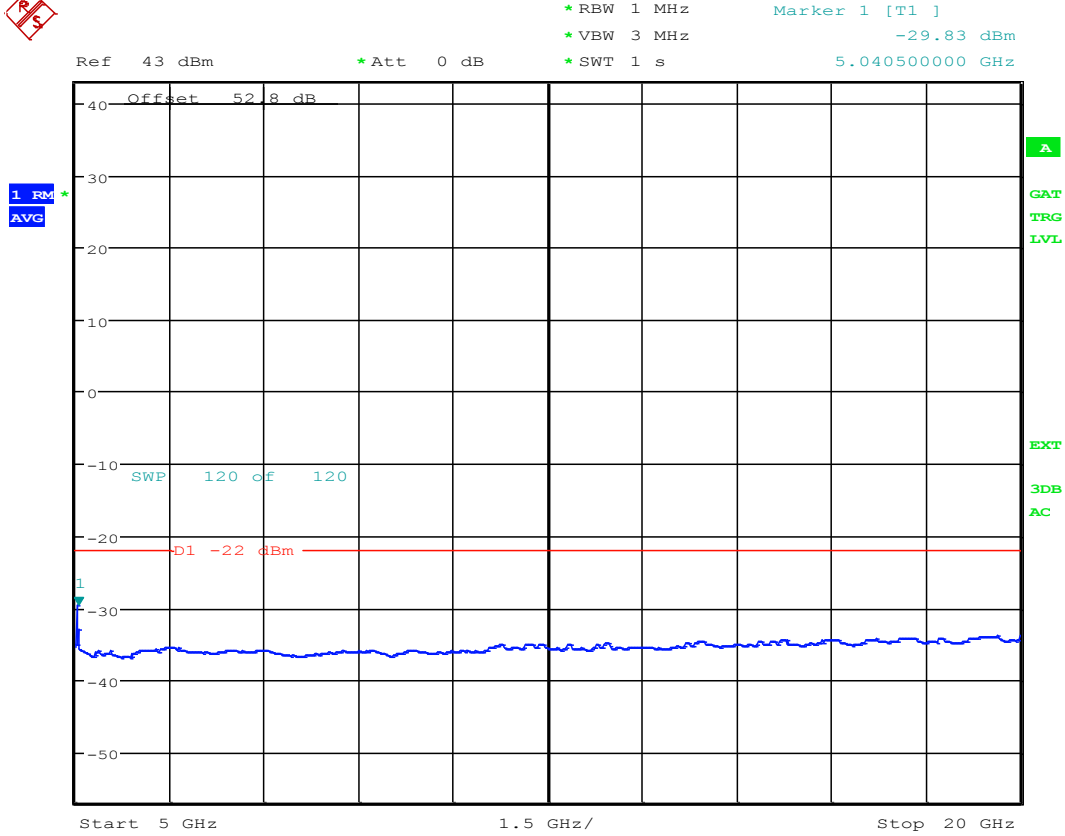
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
Date: 10.MAY.2016 10:12:06

FCCID: AS5BBTRX-15



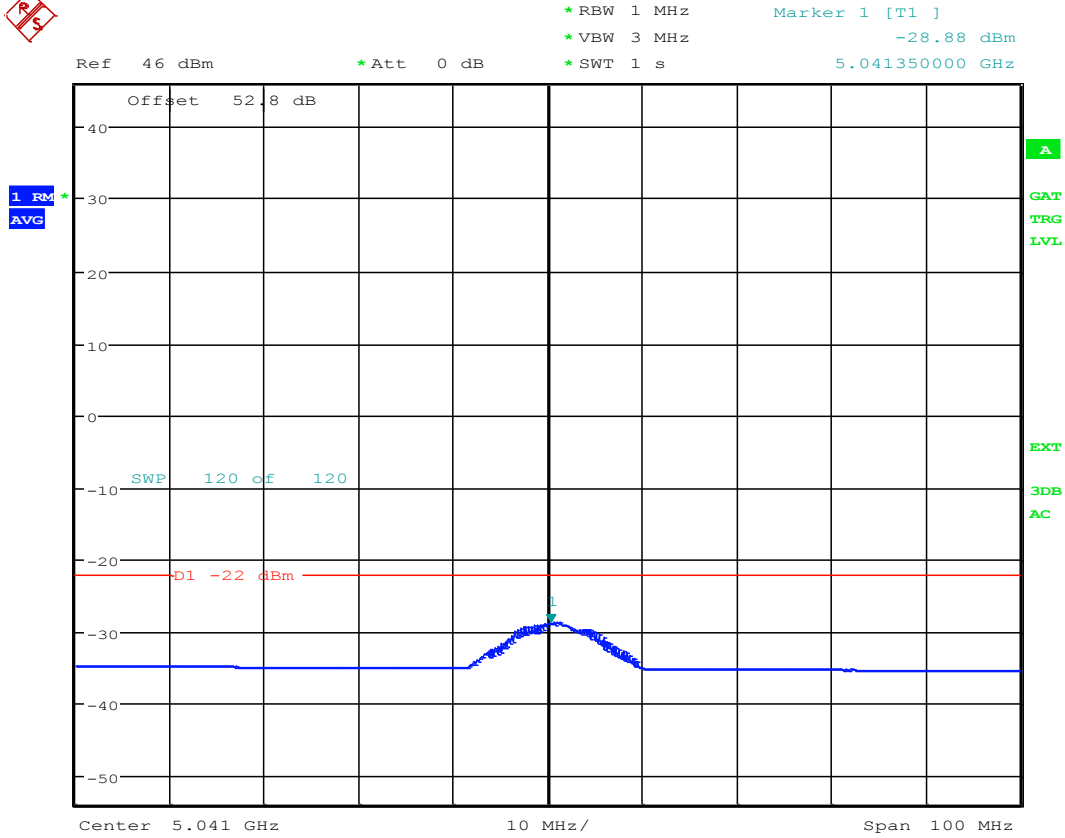
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 17:07:29

FCCID: AS5BBTRX-15



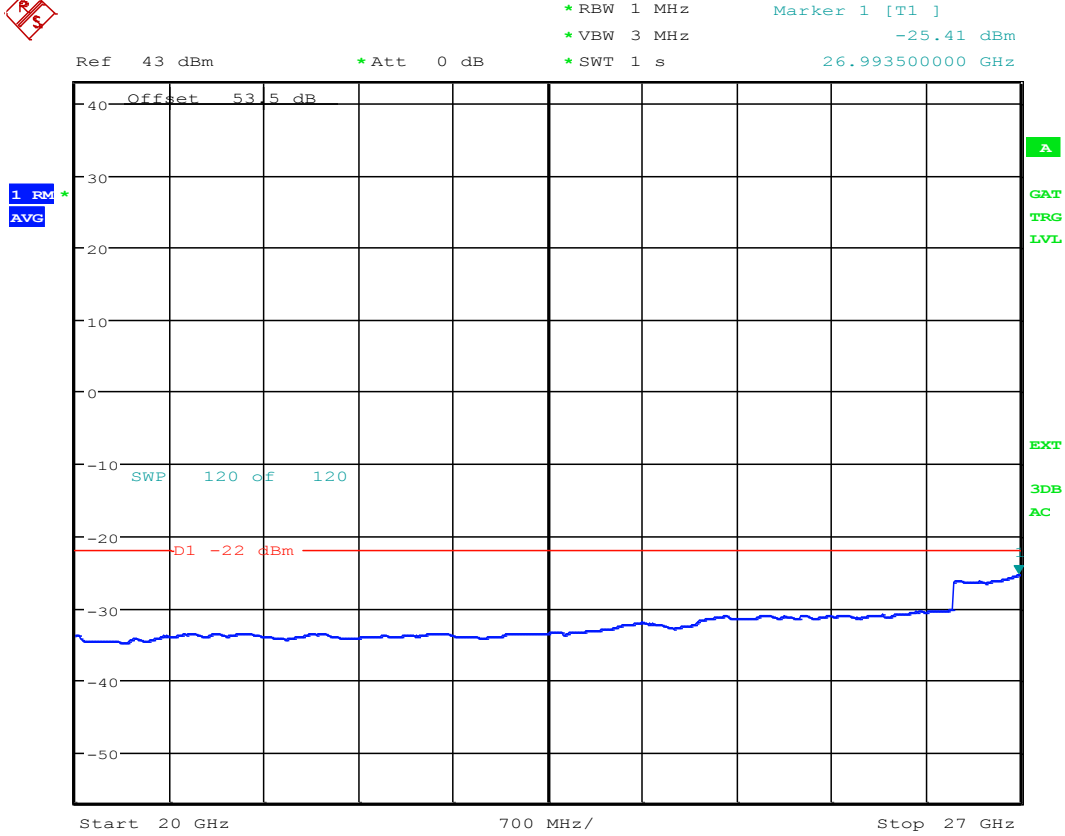
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 16:55:30

FCCID: AS5BBTRX-15



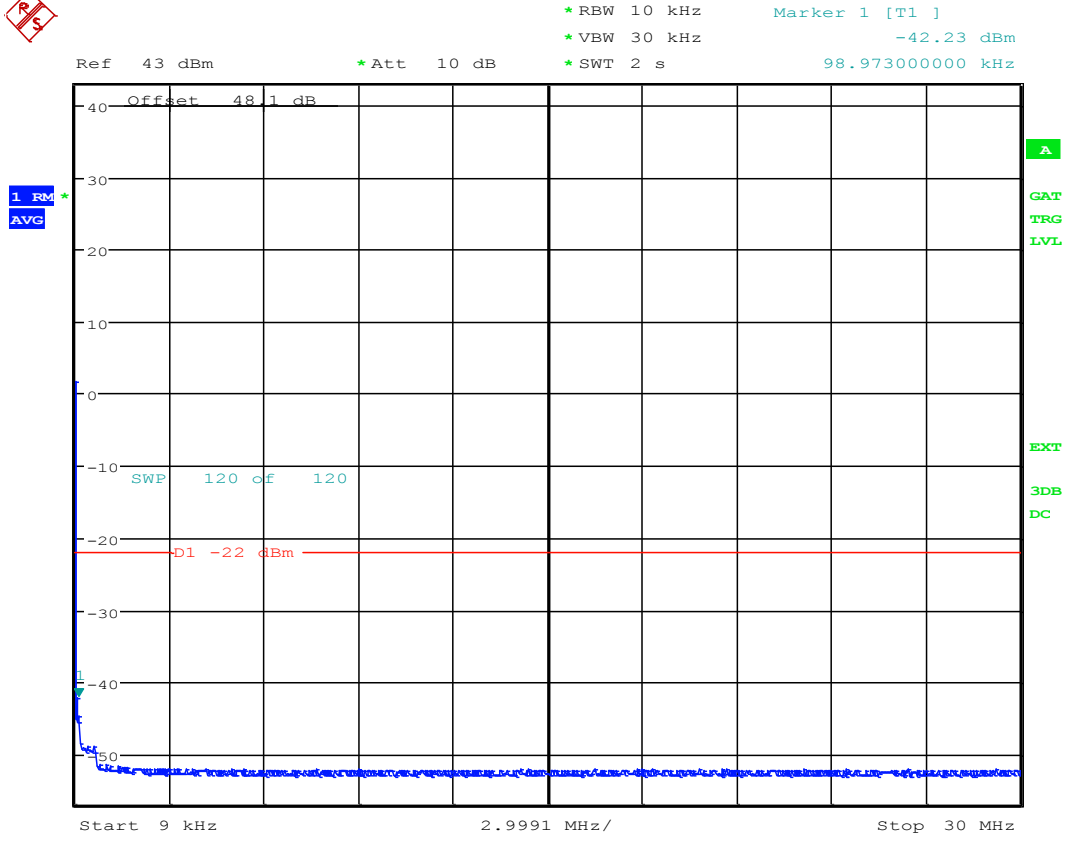
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 09:59:52

FCCID: AS5BBTRX-15



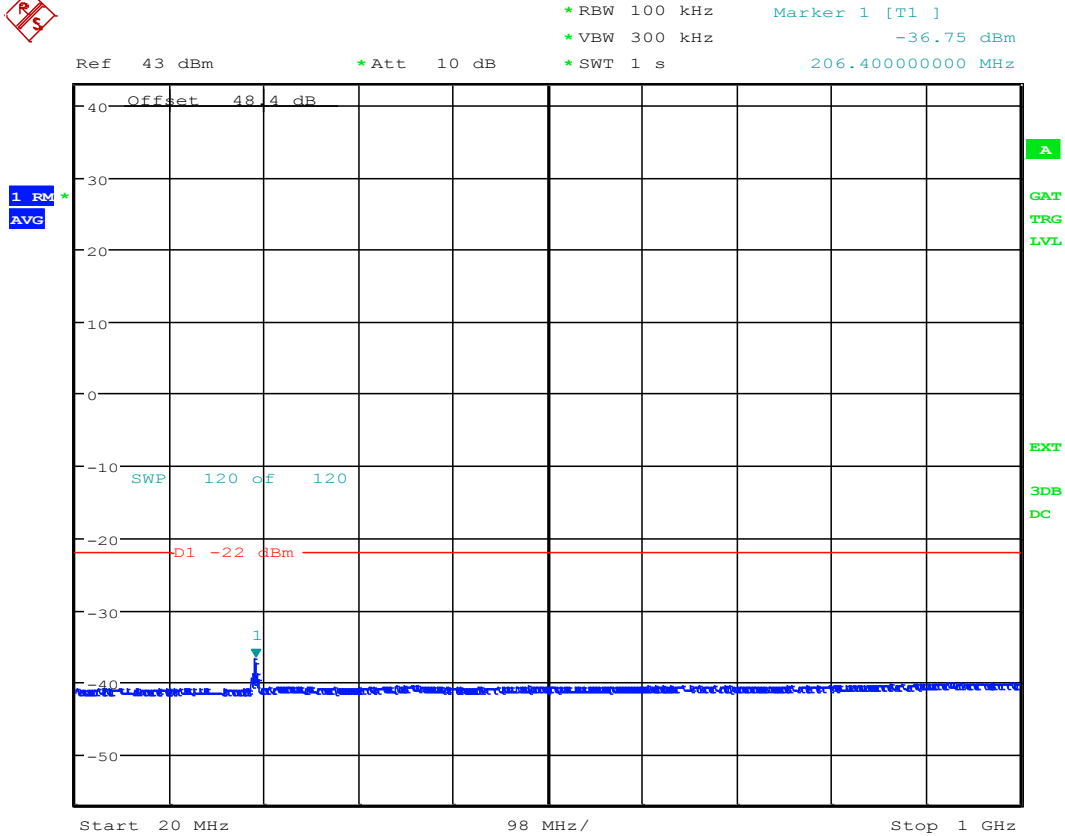
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 16:43:32

FCCID: AS5BBTRX-15



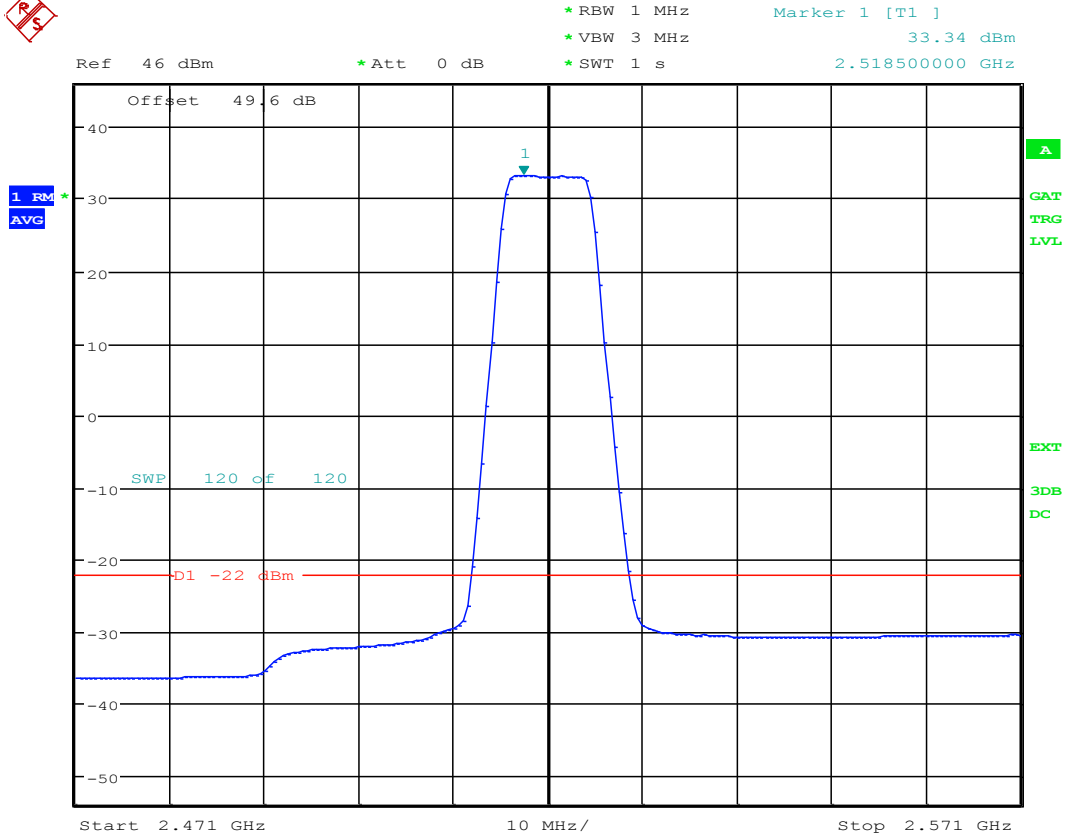
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 9.MAY.2016 14:56:48

FCCID: AS5BBTRX-15



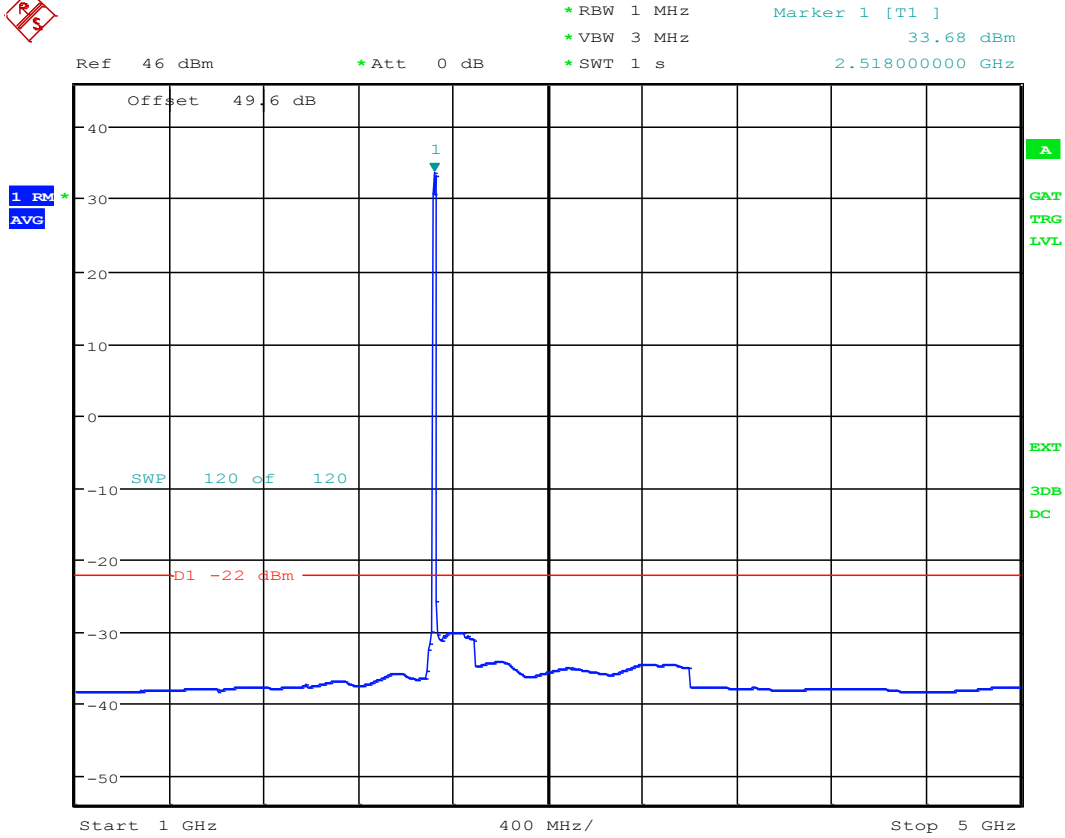
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 13:12:37

FCCID: AS5BBTRX-15



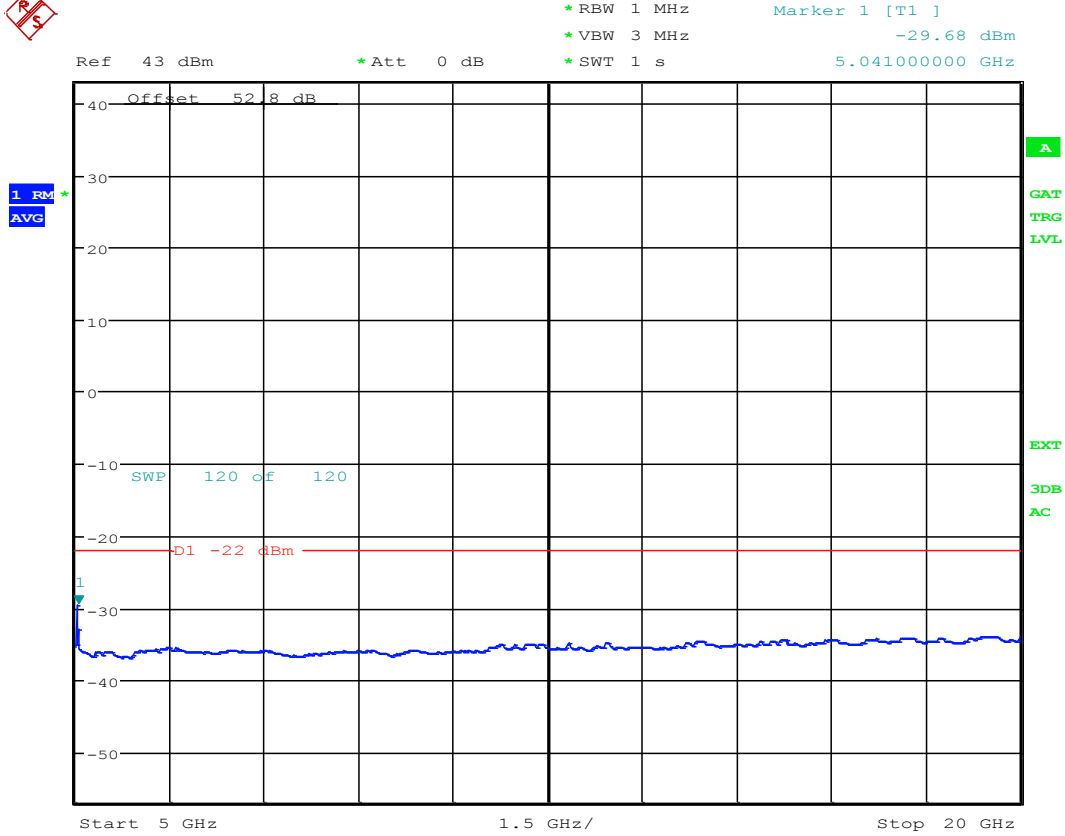
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 14:06:01

FCCID: AS5BBTRX-15



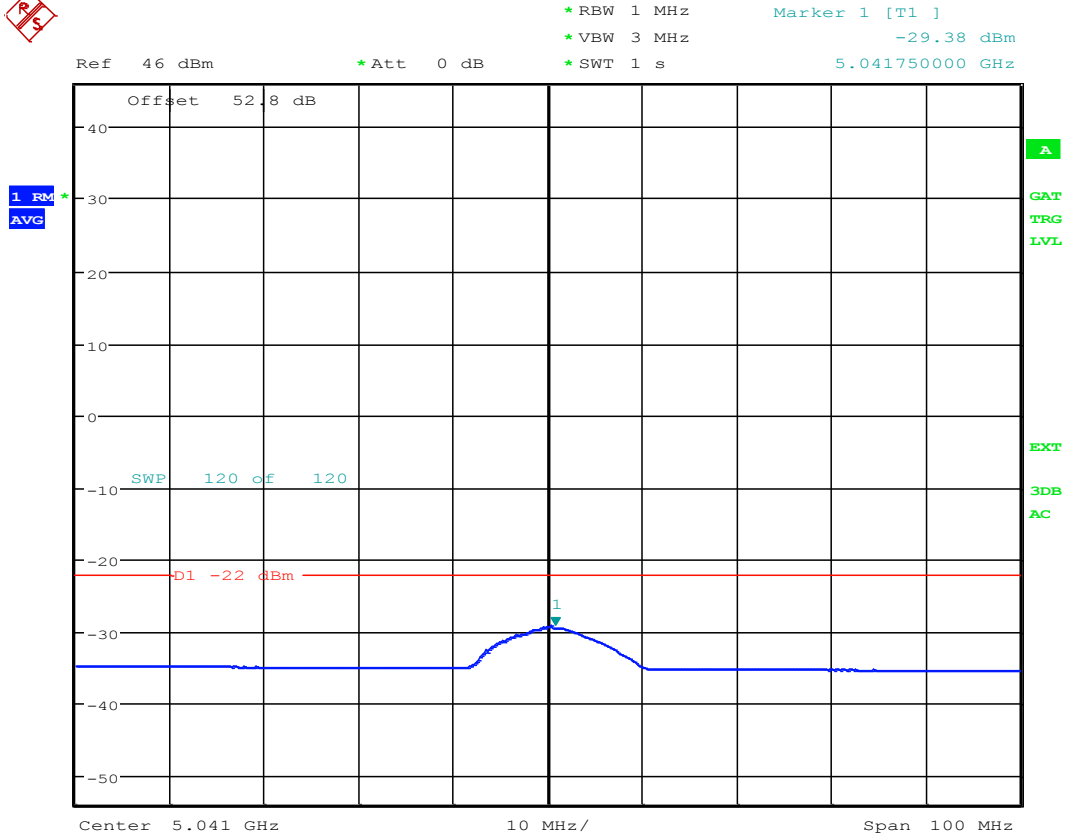
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 13:24:43

FCCID: AS5BBTRX-15



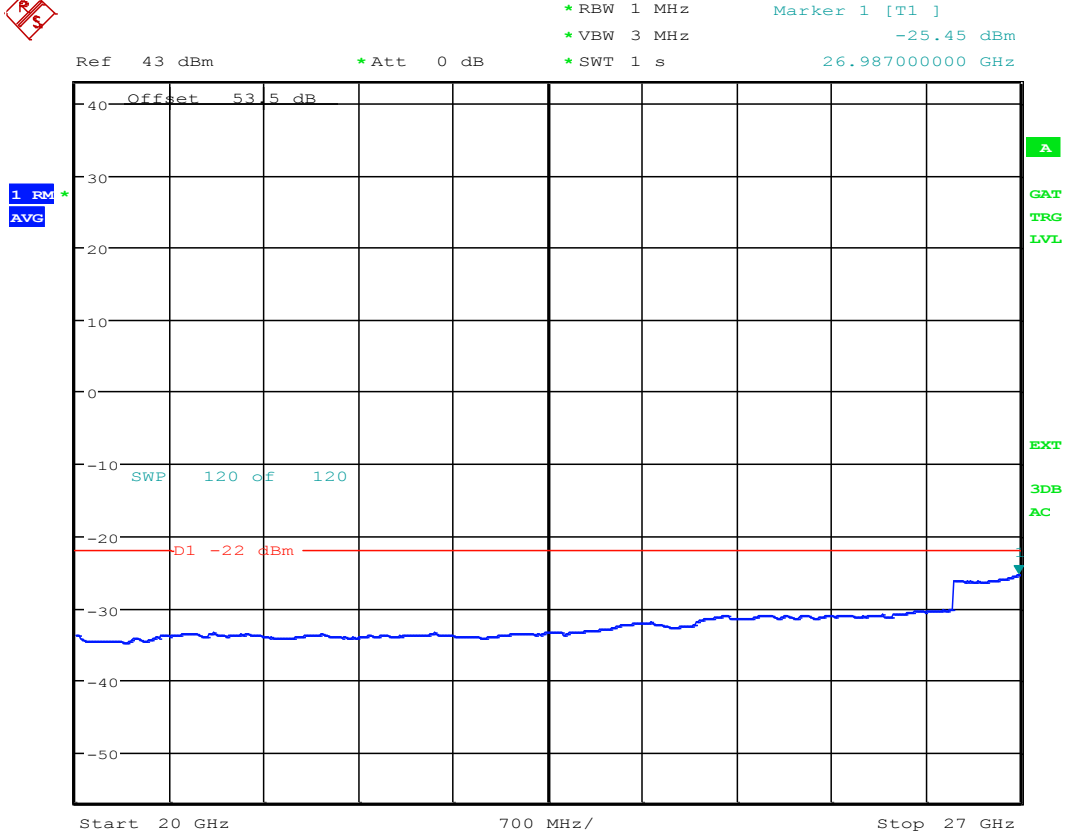
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A;CII
Date: 9.MAY.2016 13:42:19

FCCID: AS5BBTRX-15



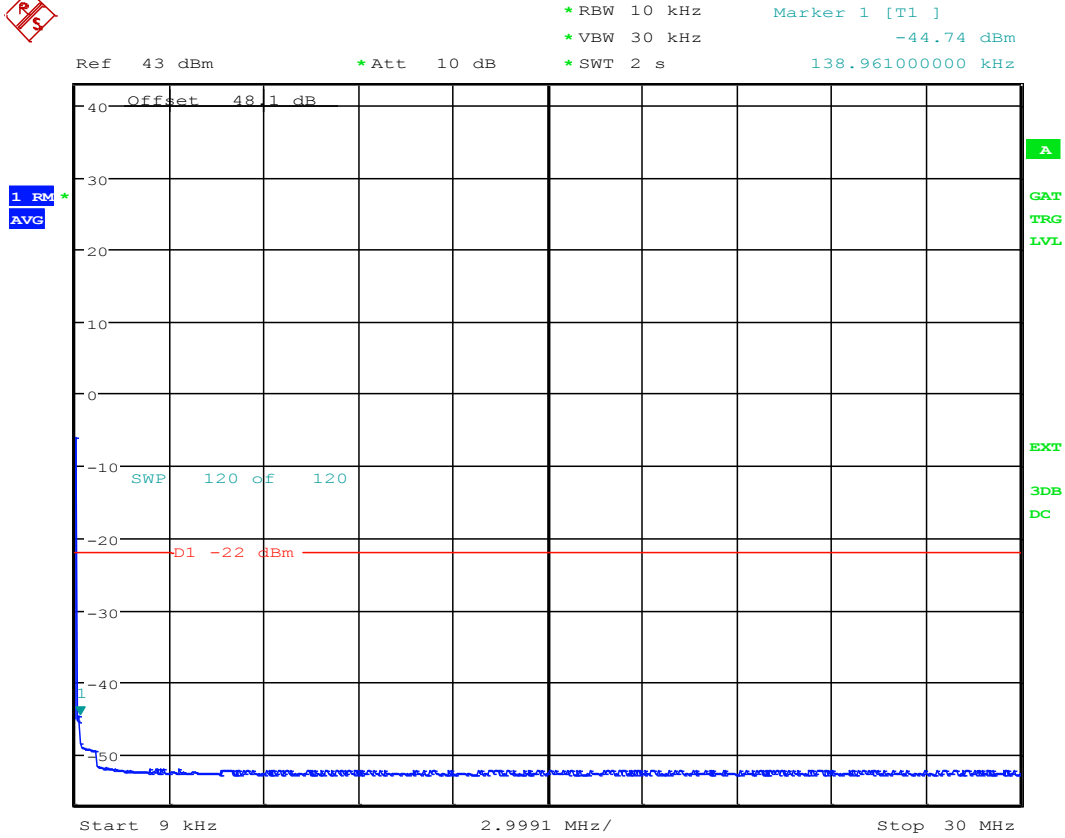
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 14:18:48

FCCID: AS5BBTRX-15



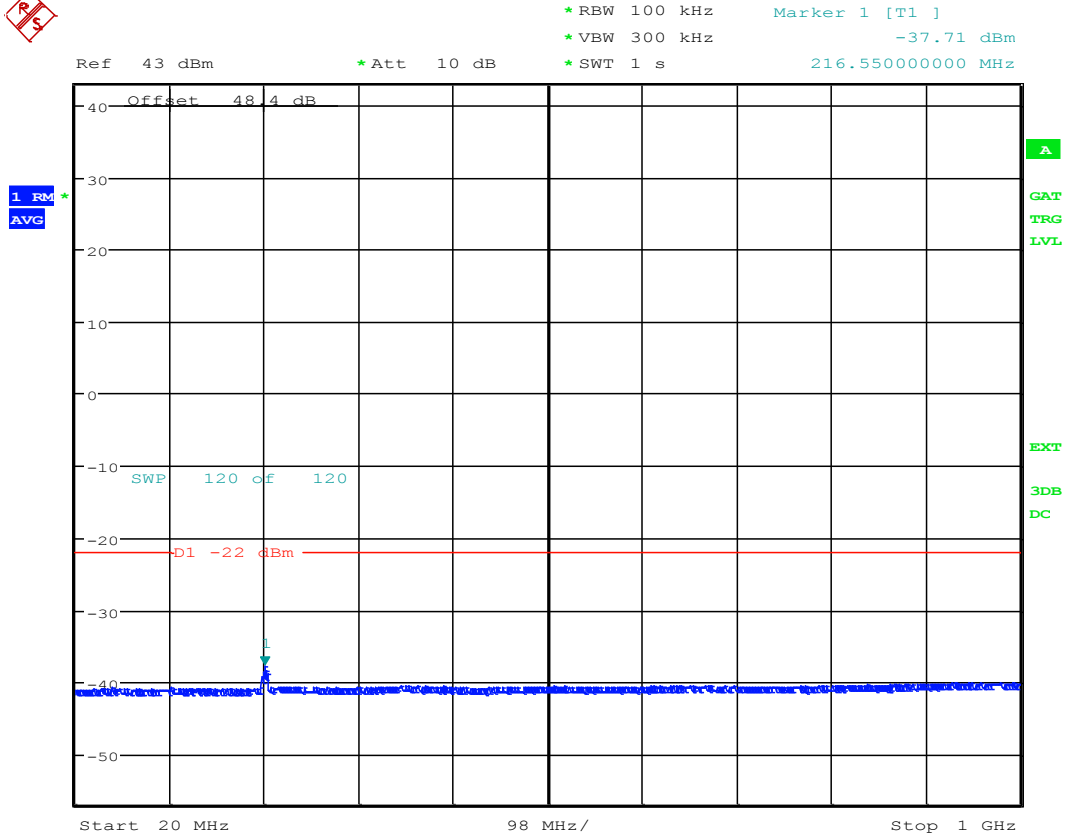
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2516-2526M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 9.MAY.2016 13:54:21

FCCID: AS5BBTRX-15



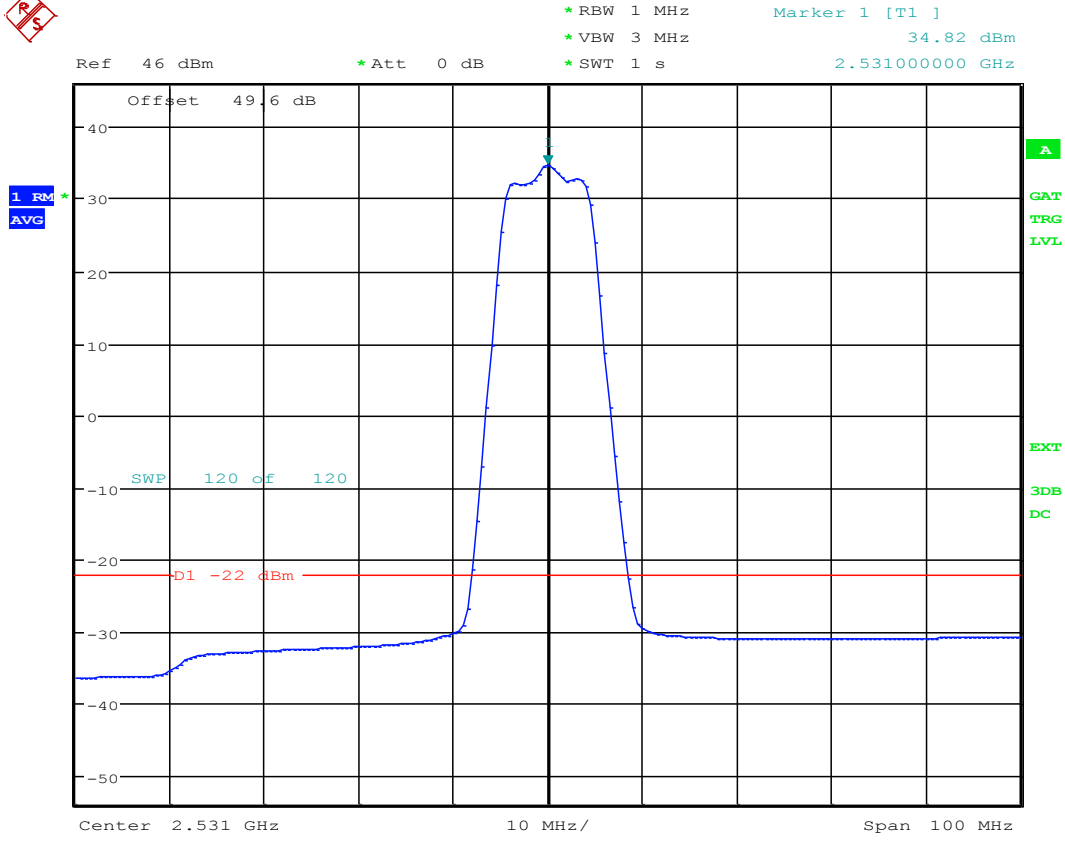
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A; CII
 Date: 10.MAY.2016 11:32:16

FCCID: AS5BBTRX-15



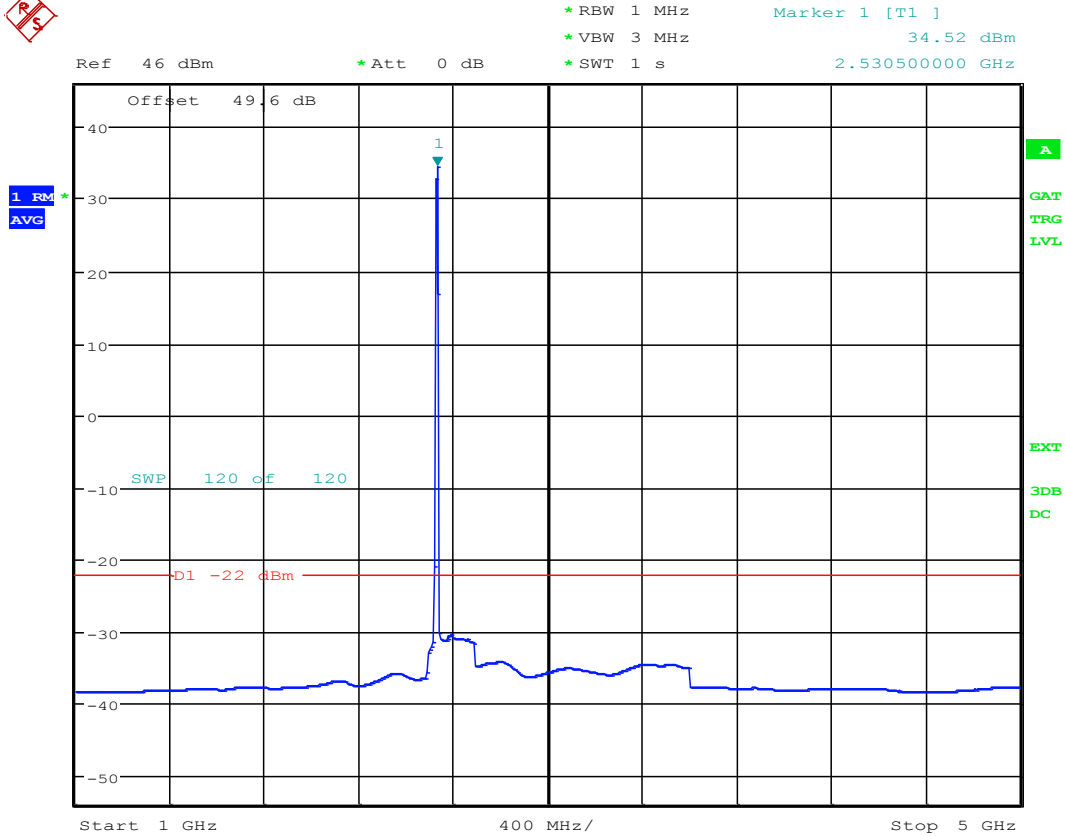
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 12:00:36

FCCID: AS5BBTRX-15



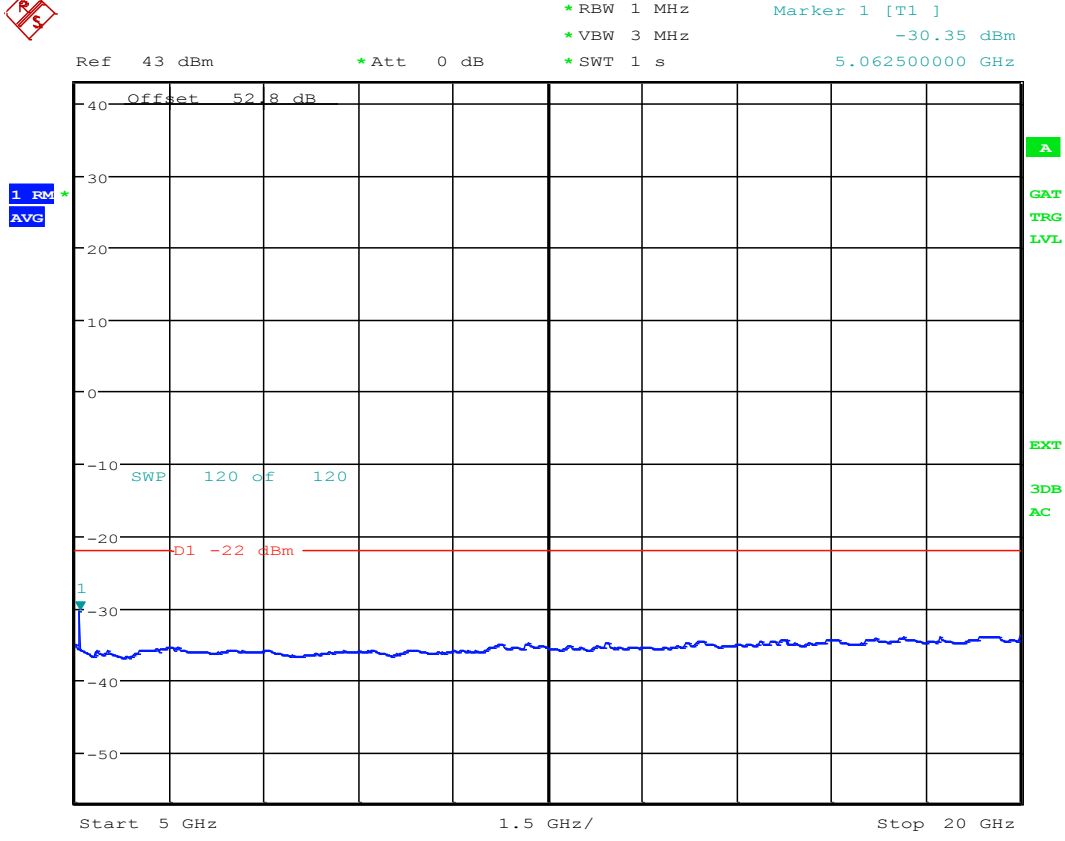
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
Date: 10.MAY.2016 12:38:05

FCCID: AS5BBTRX-15



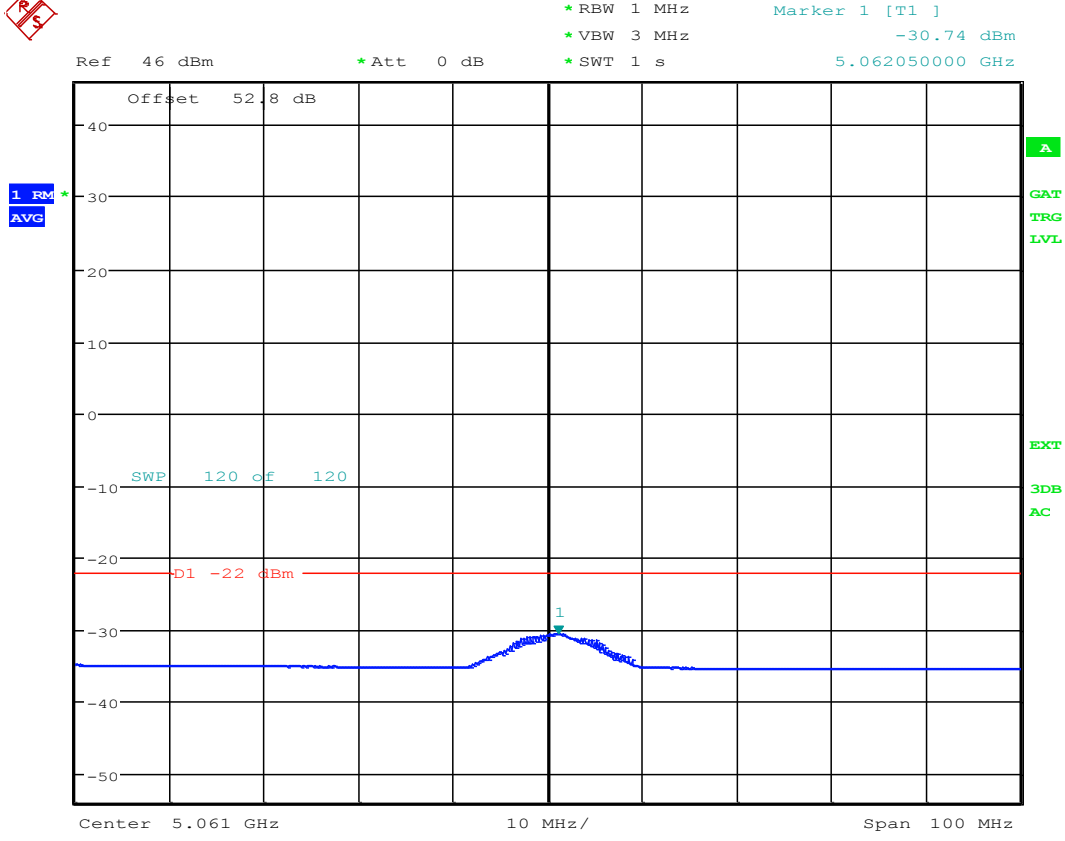
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 12:13:00

FCCID: AS5BBTRX-15



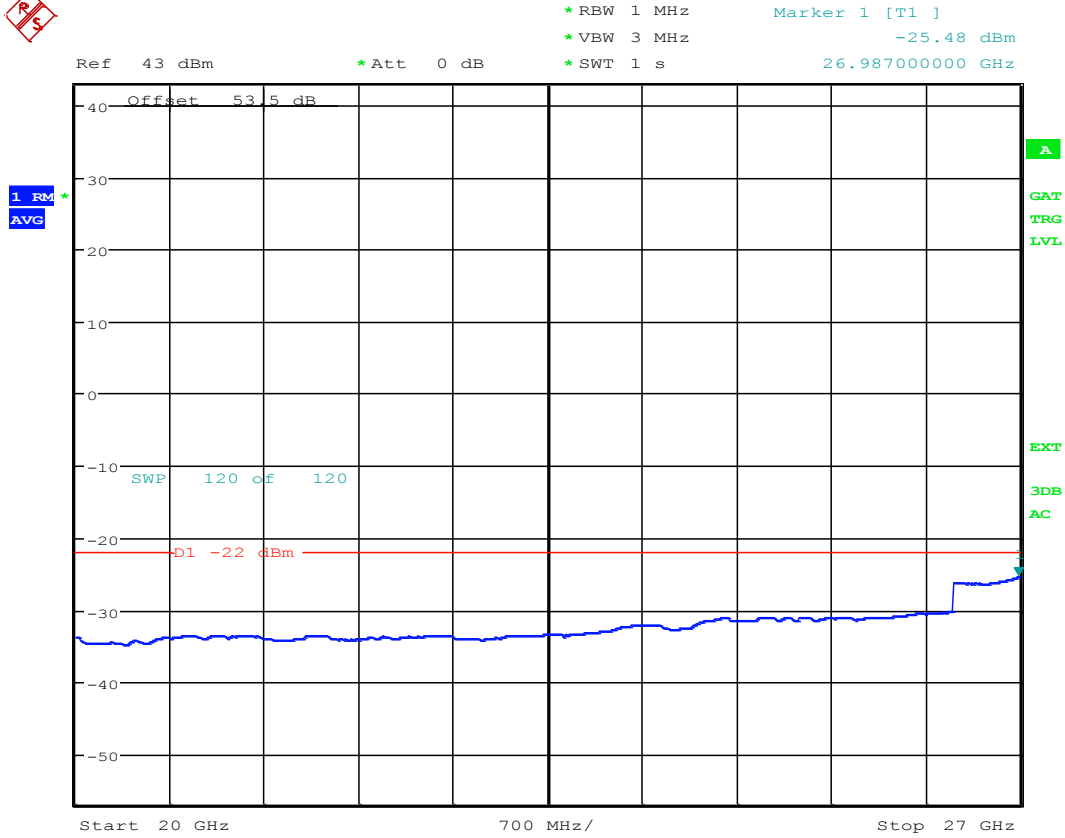
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 12:25:34

FCCID: AS5BBTRX-15



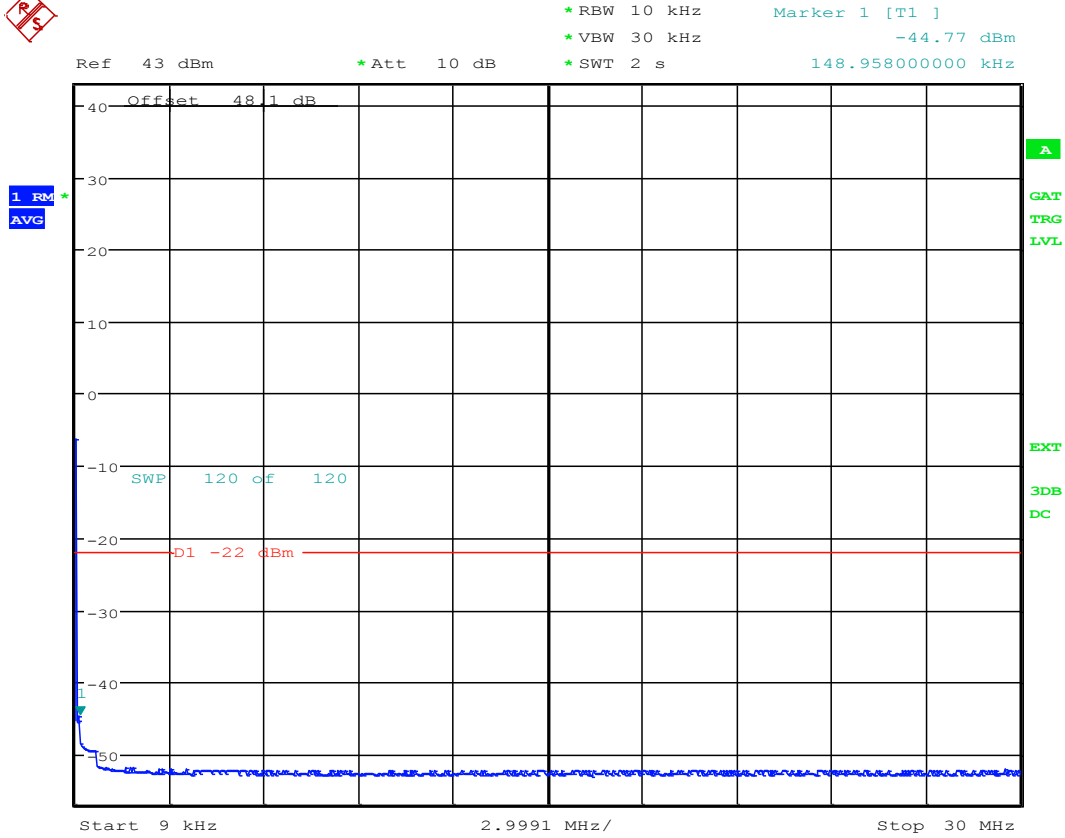
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 12:50:02

FCCID: AS5BBTRX-15



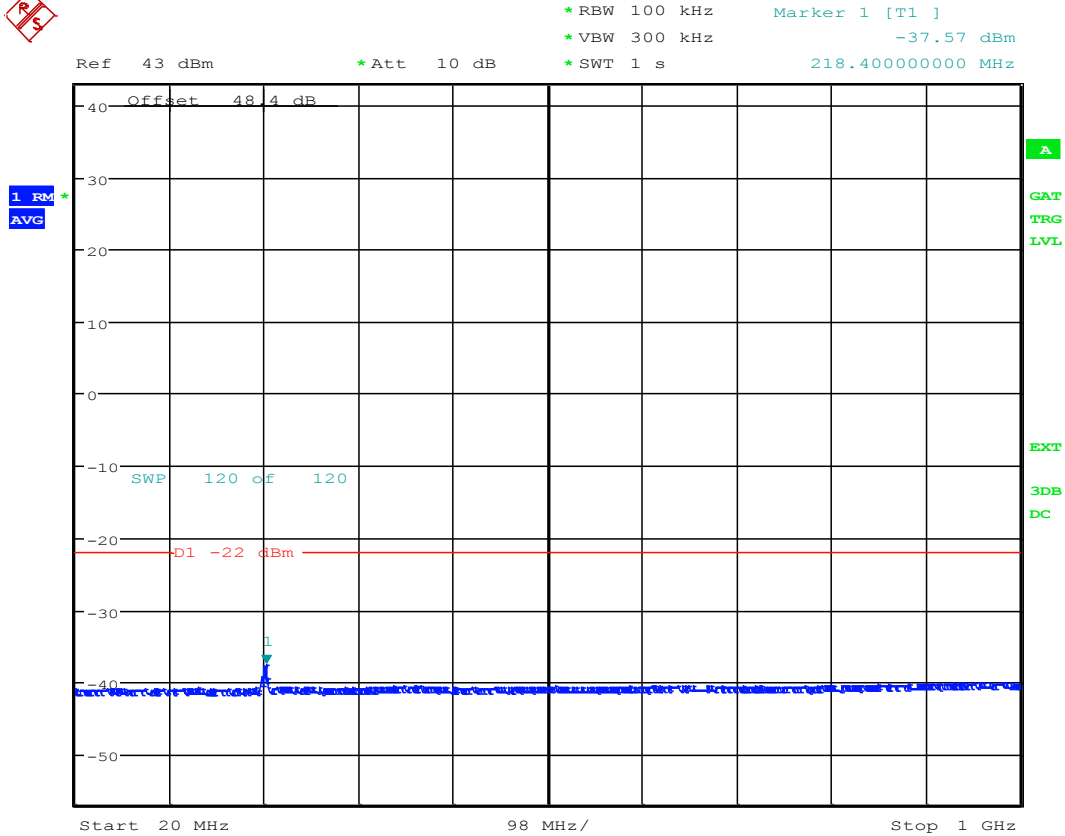
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 13:02:19

FCCID: AS5BBTRX-15



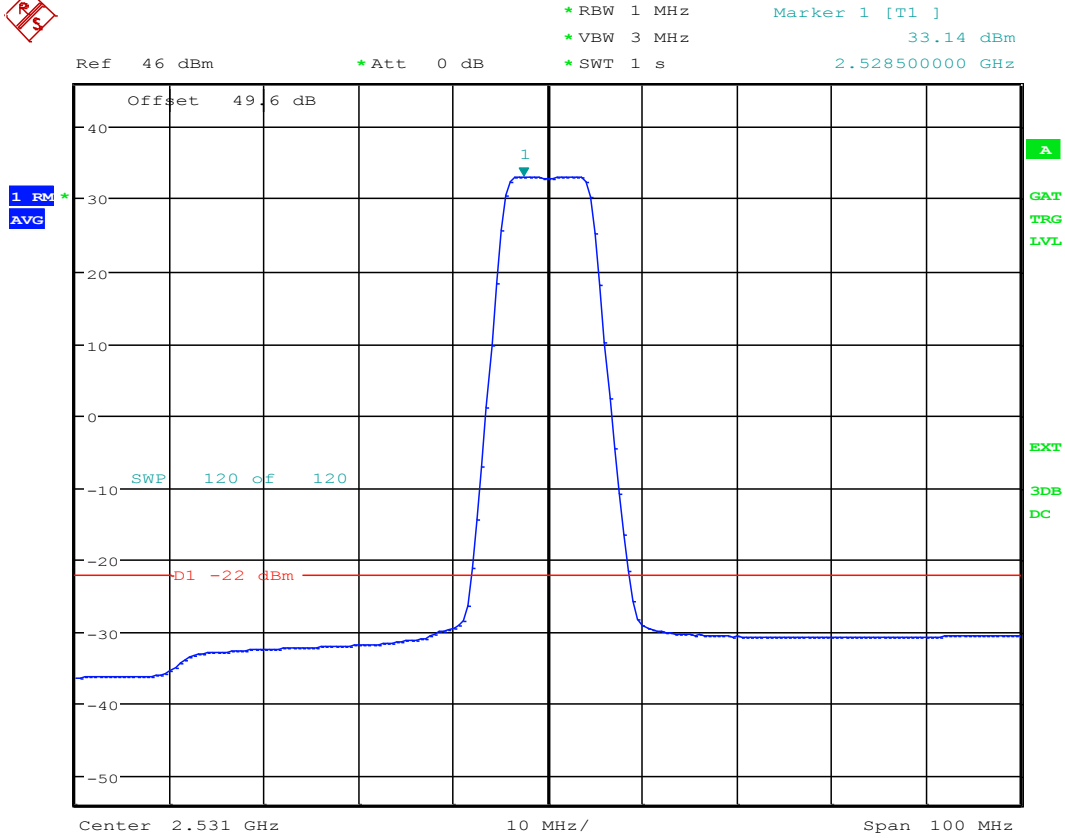
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 10.MAY.2016 15:39:27

FCCID: AS5BBTRX-15



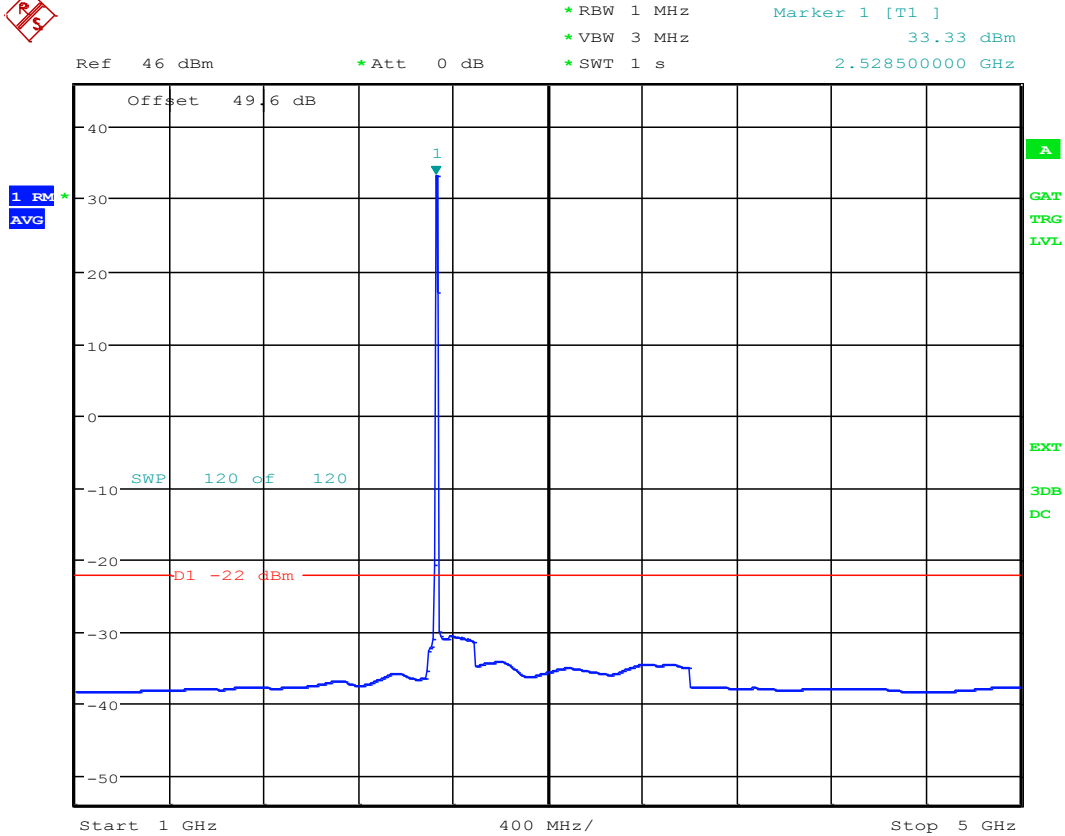
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 14:31:40

FCCID: AS5BBTRX-15



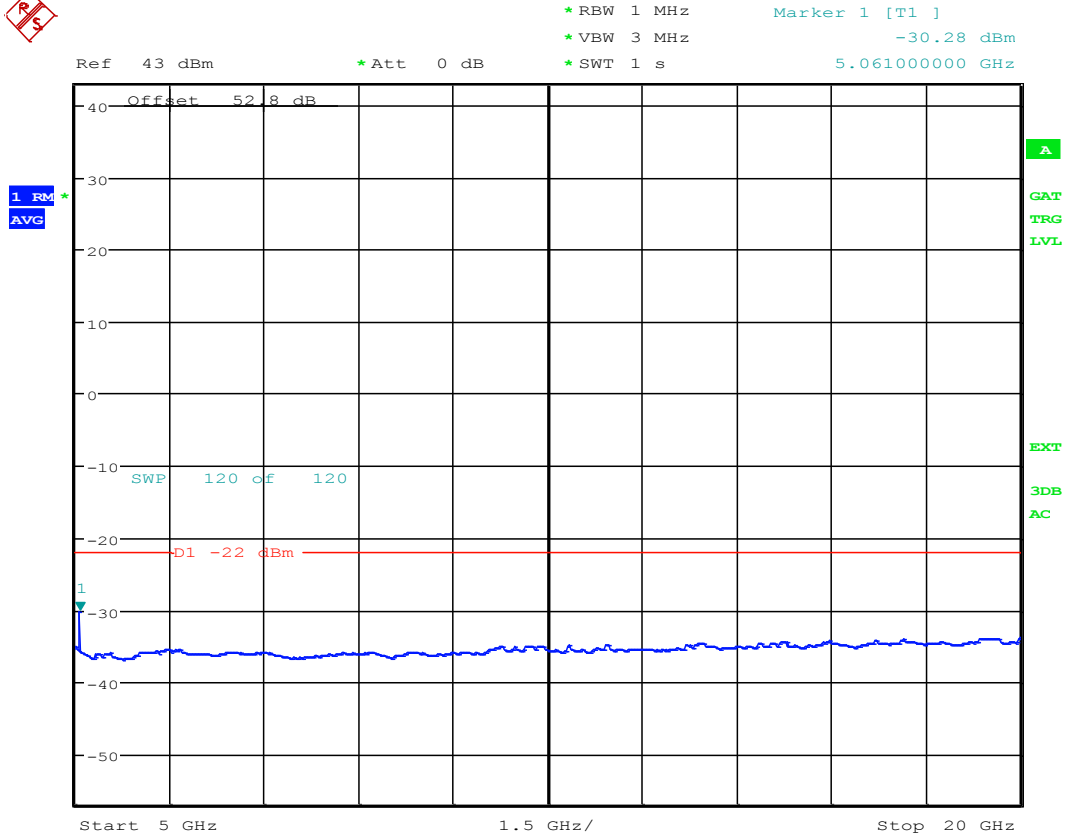
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 13:40:09

FCCID: AS5BBTRX-15



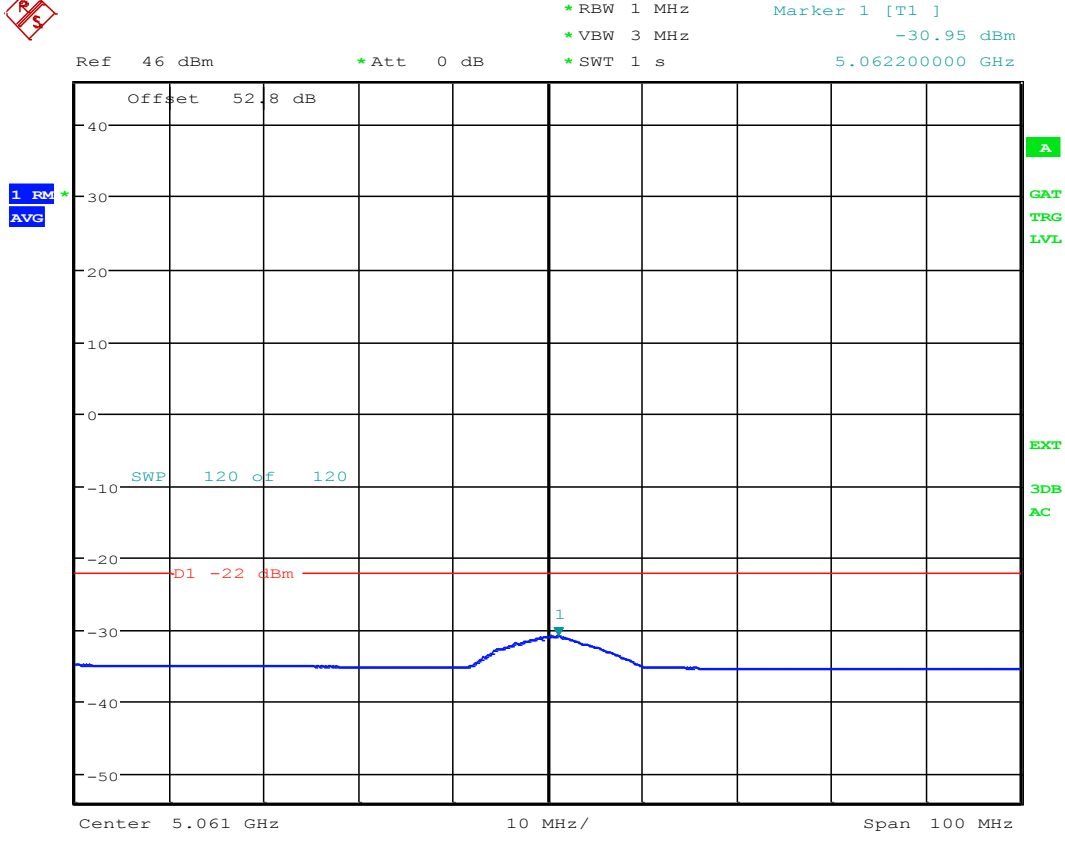
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 14:20:03

FCCID: AS5BBTRX-15



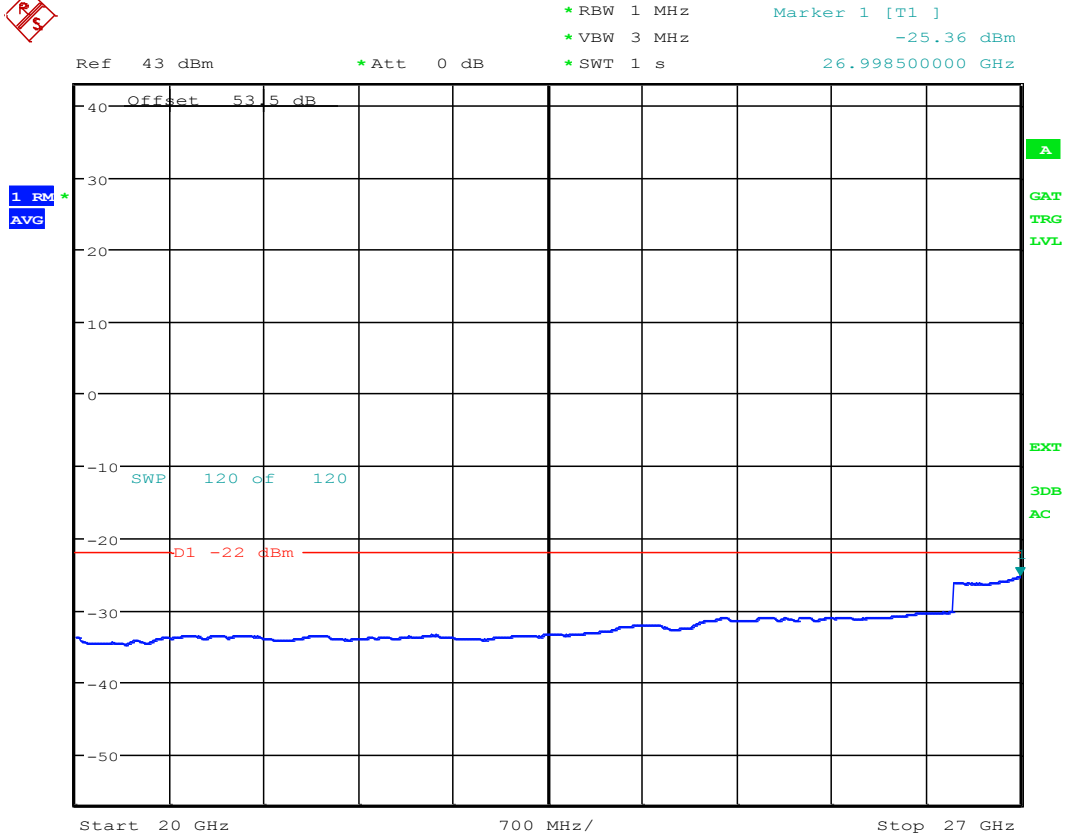
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 14:07:00

FCCID: AS5BBTRX-15



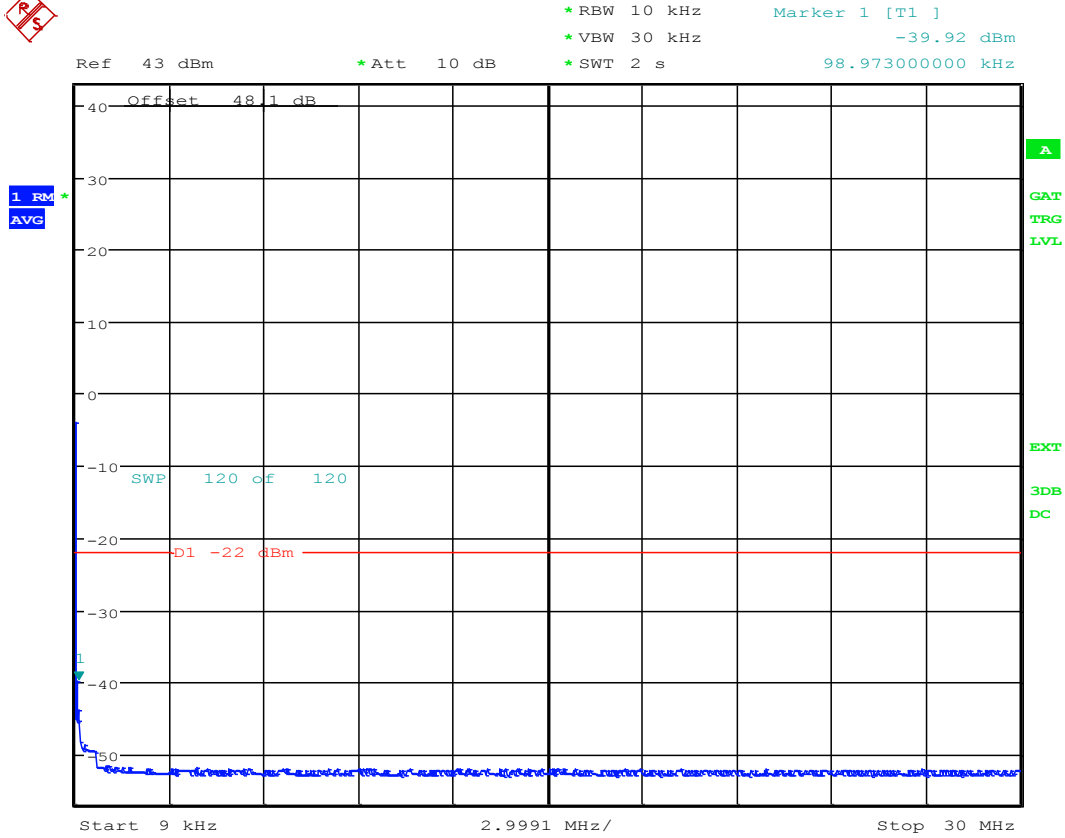
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 13:53:12

FCCID: AS5BBTRX-15



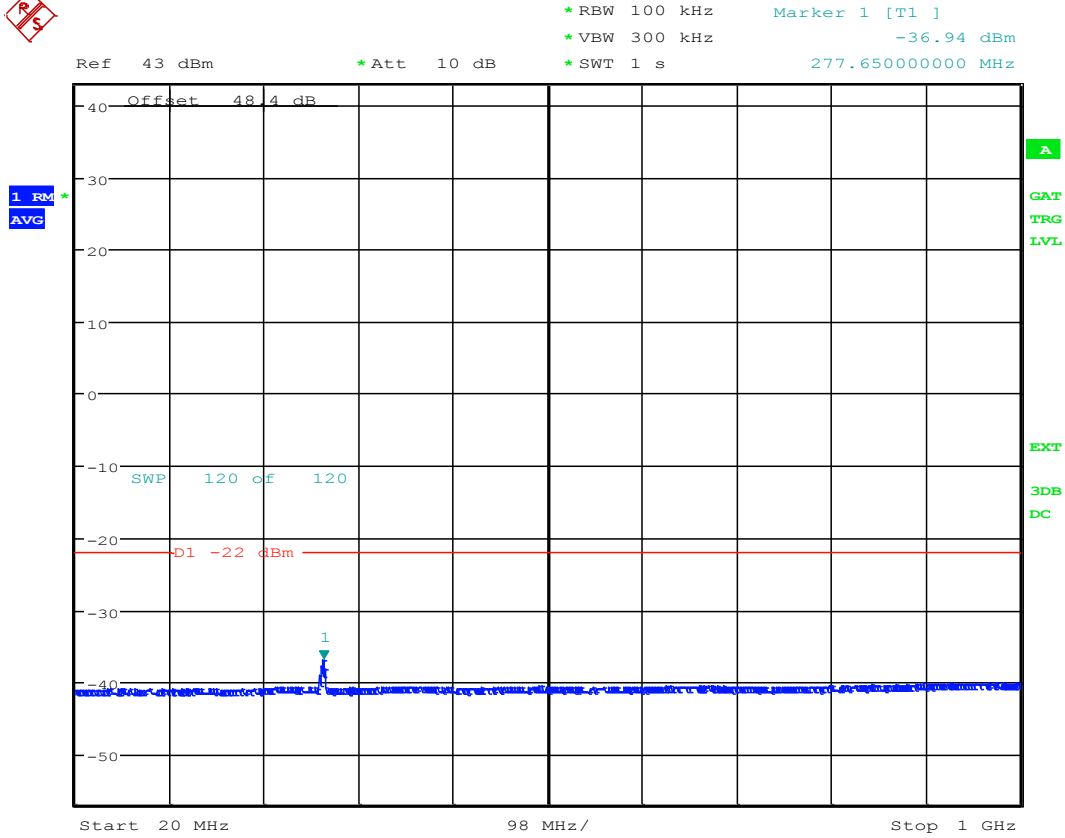
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2526-2536M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 10.MAY.2016 13:26:45

FCCID: AS5BBTRX-15



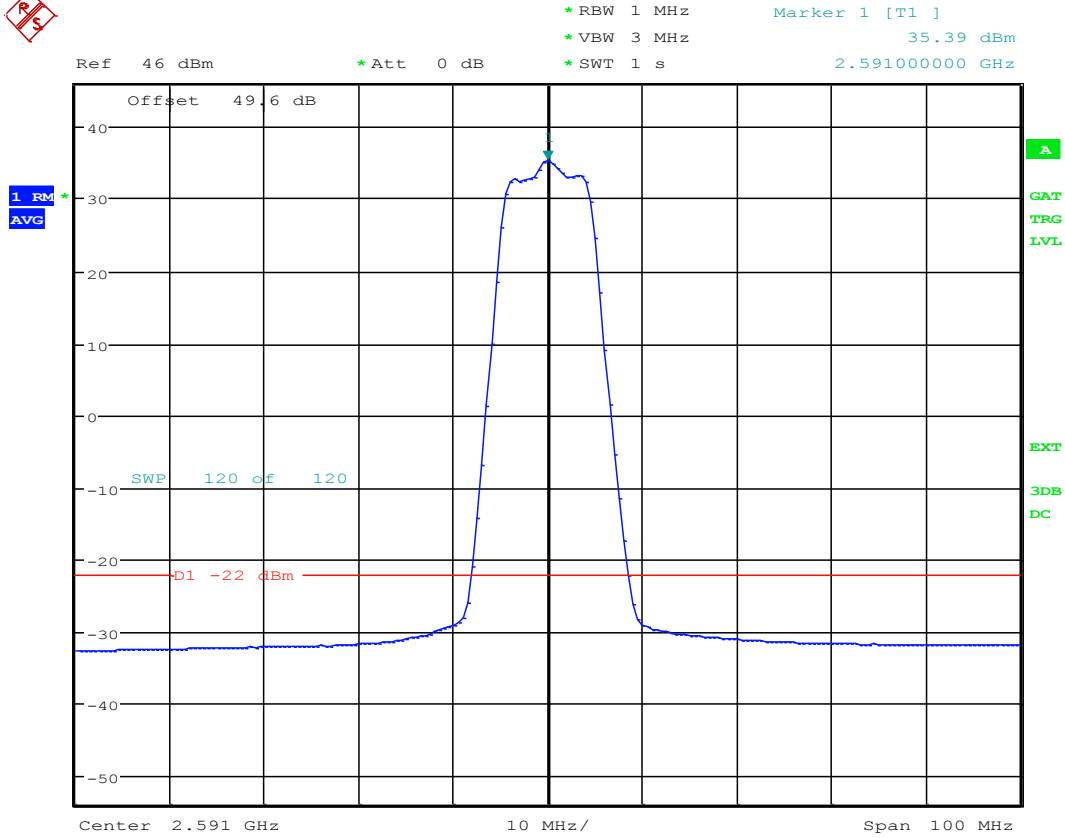
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A; CII
 Date: 16.MAY.2016 13:52:01

FCCID: AS5BBTRX-15



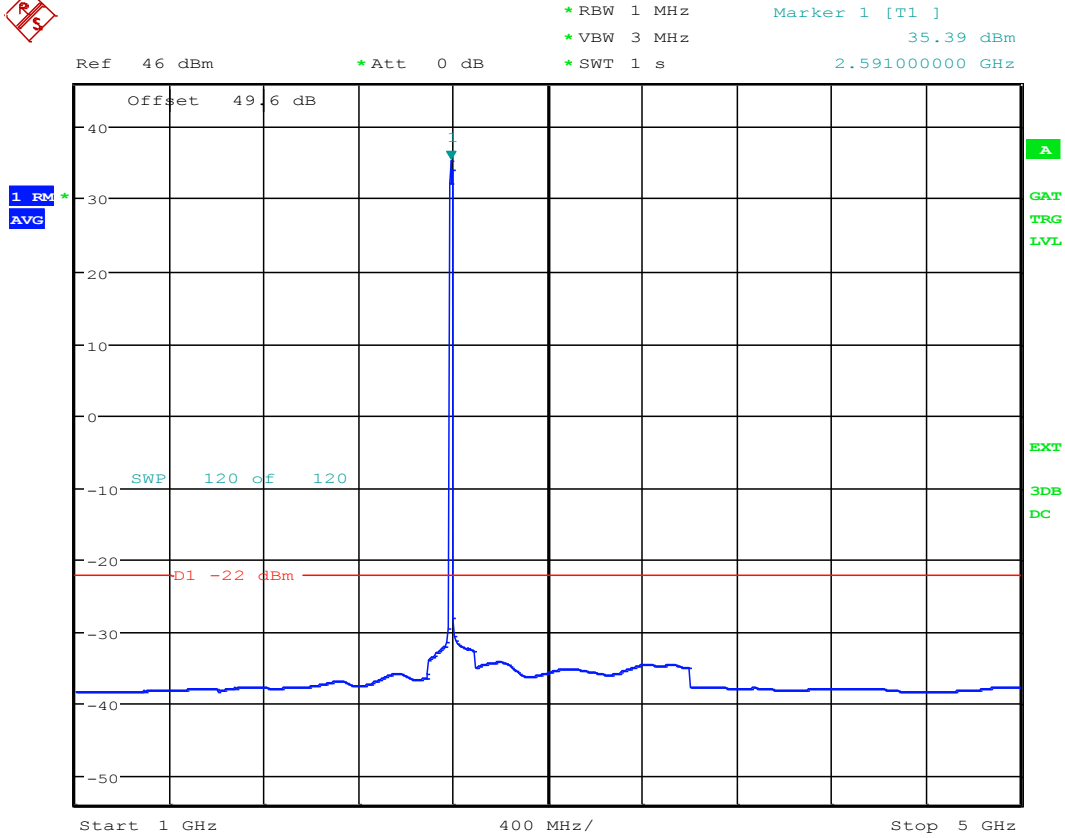
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 14:18:11

FCCID: AS5BBTRX-15



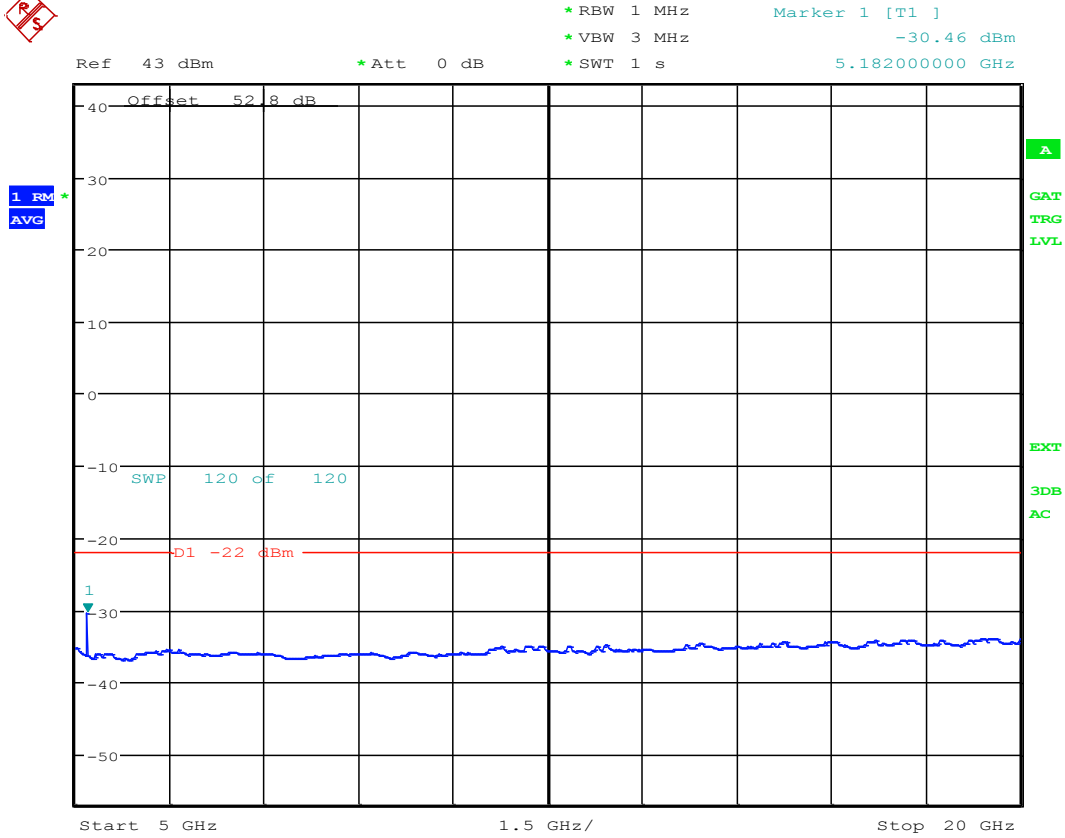
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 14:54:44

FCCID: AS5BBTRX-15



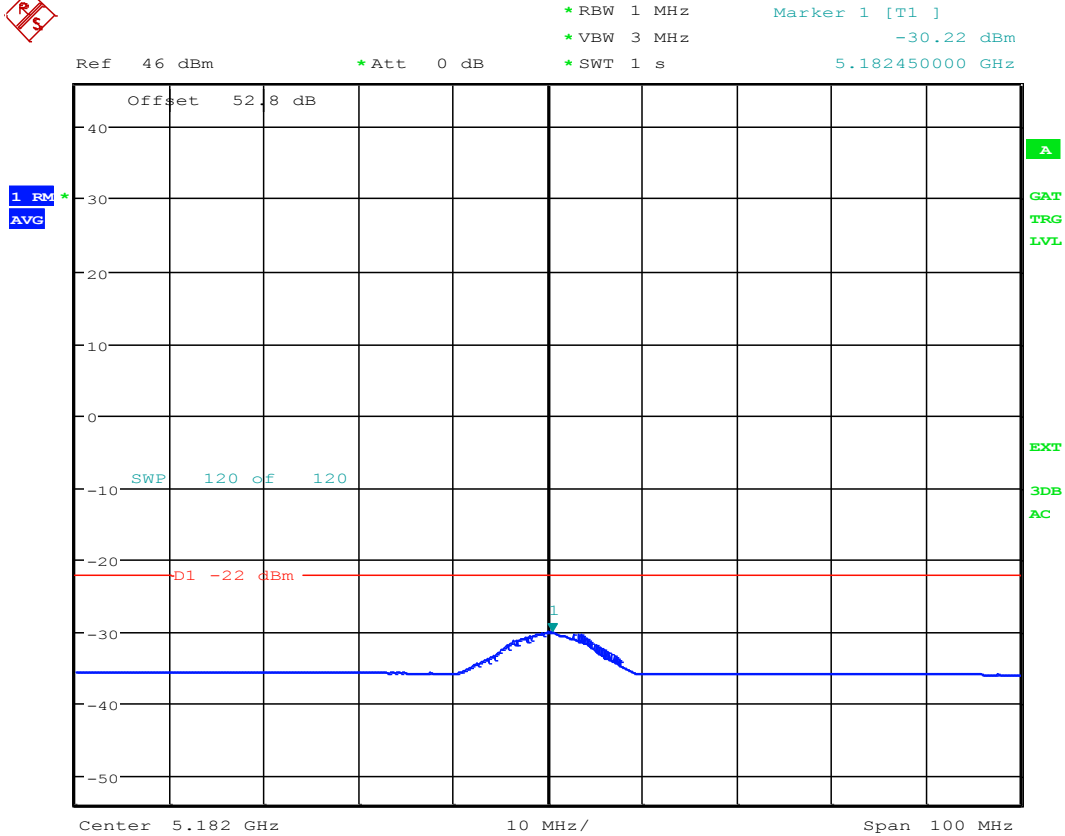
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 14:31:00

FCCID: AS5BBTRX-15



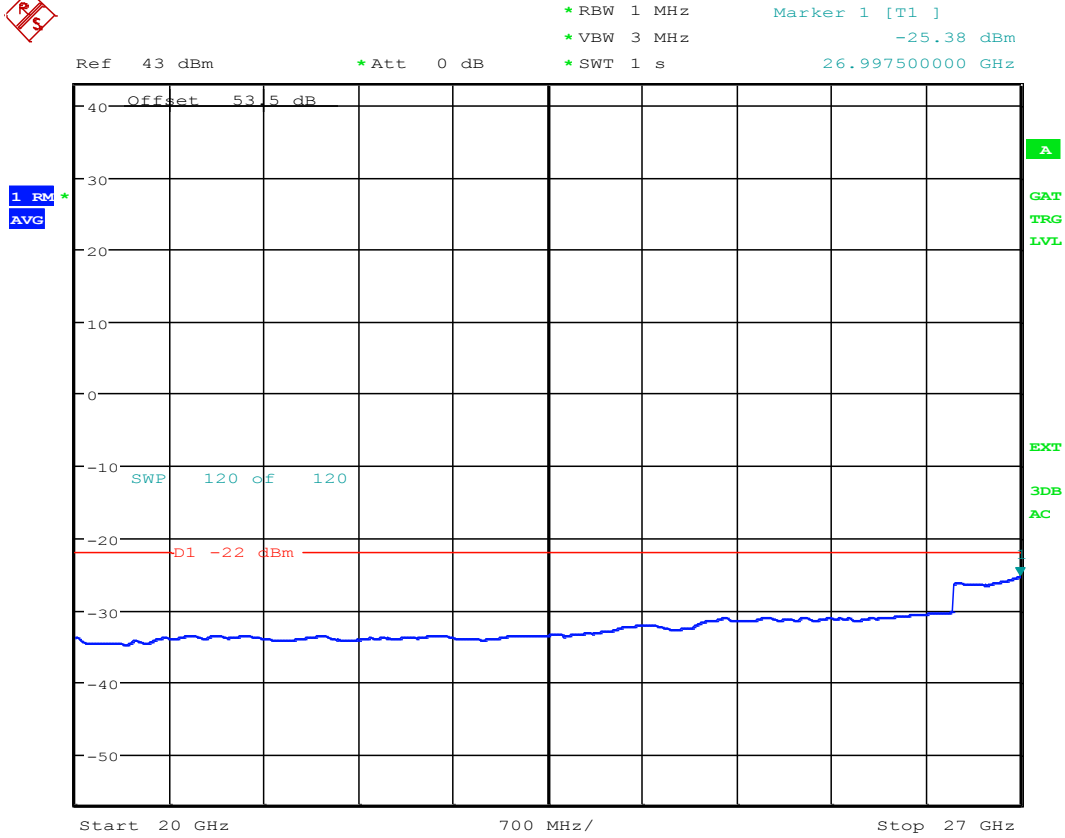
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 14:42:52

FCCID: AS5BBTRX-15



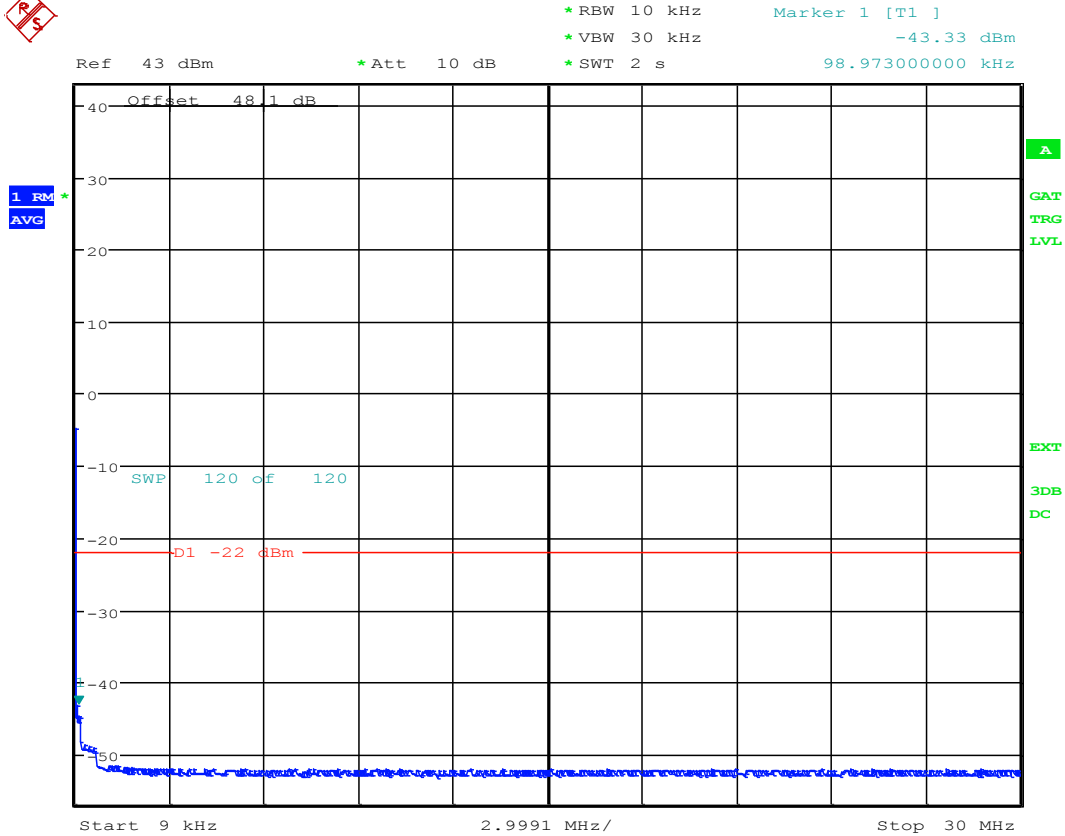
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 15:06:56

FCCID: AS5BBTRX-15



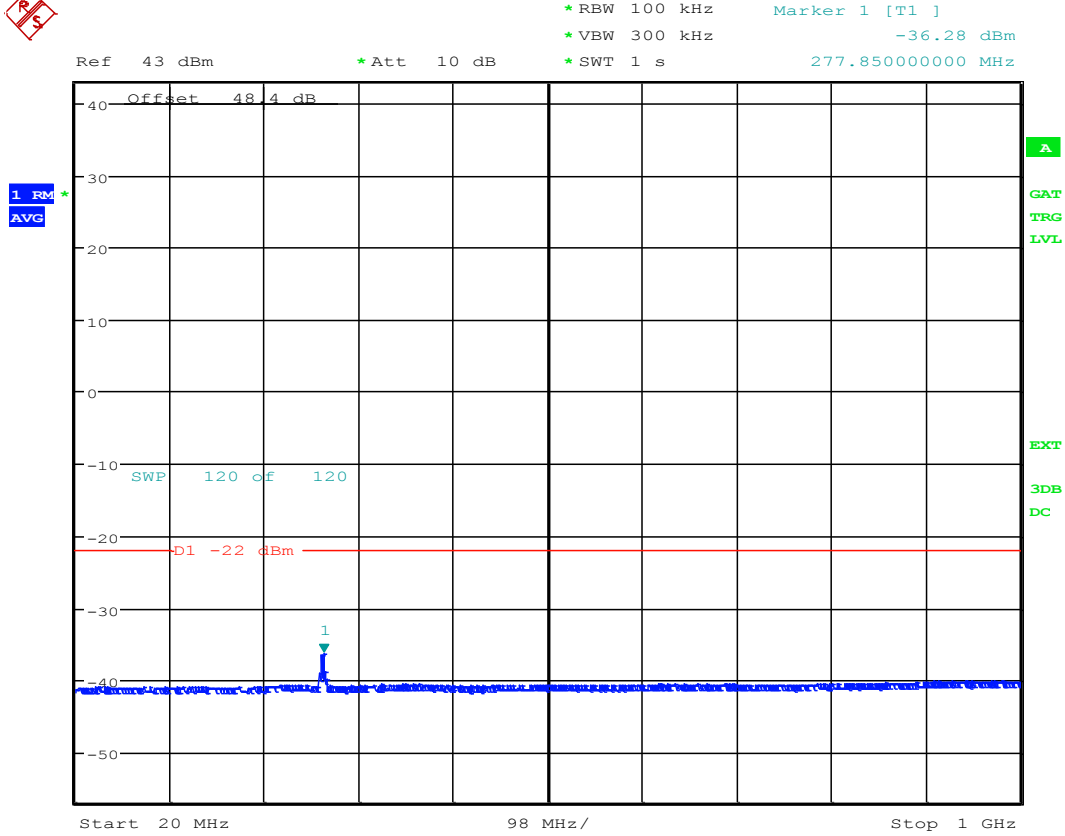
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 15:35:42

FCCID: AS5BBTRX-15



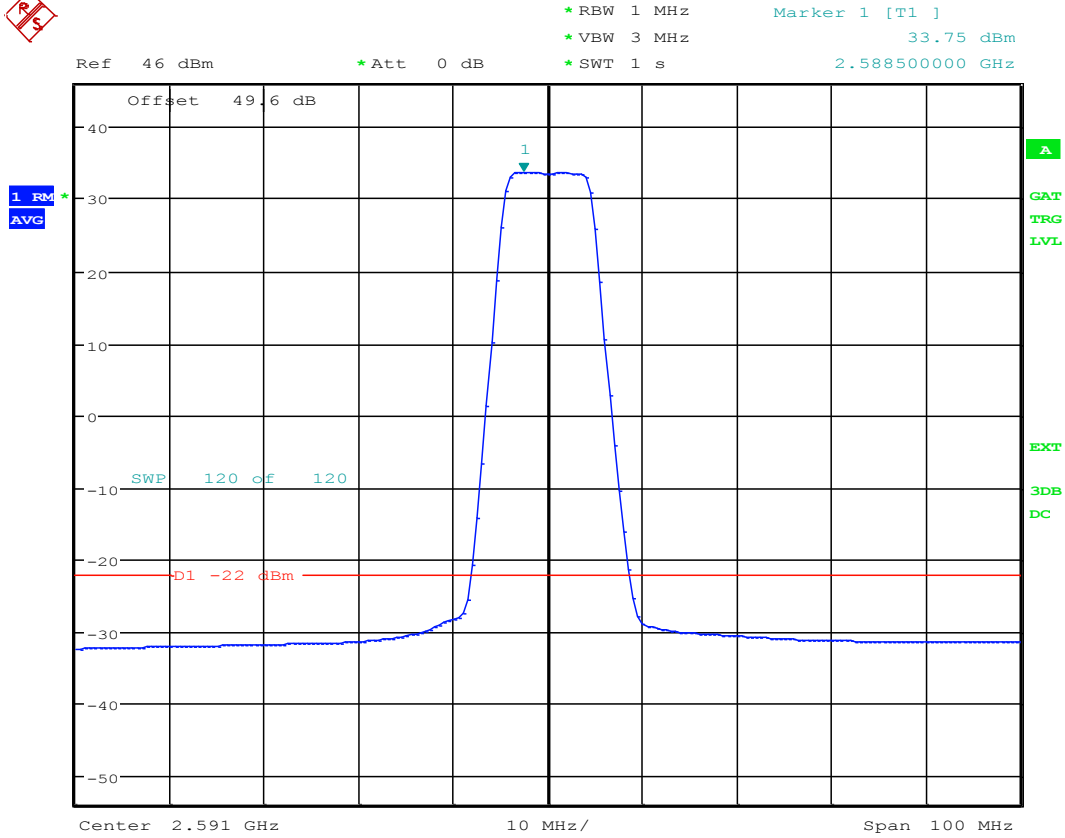
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 16.MAY.2016 17:29:04

FCCID: AS5BBTRX-15



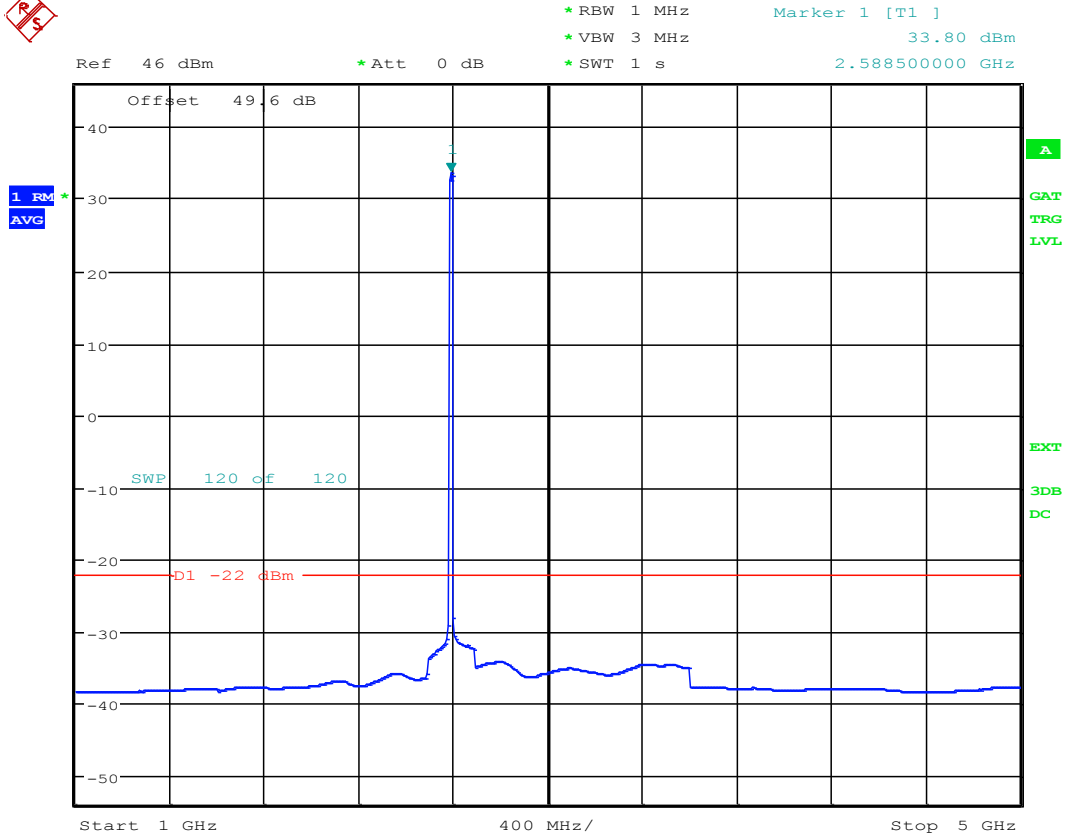
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 16:50:51

FCCID: AS5BBTRX-15



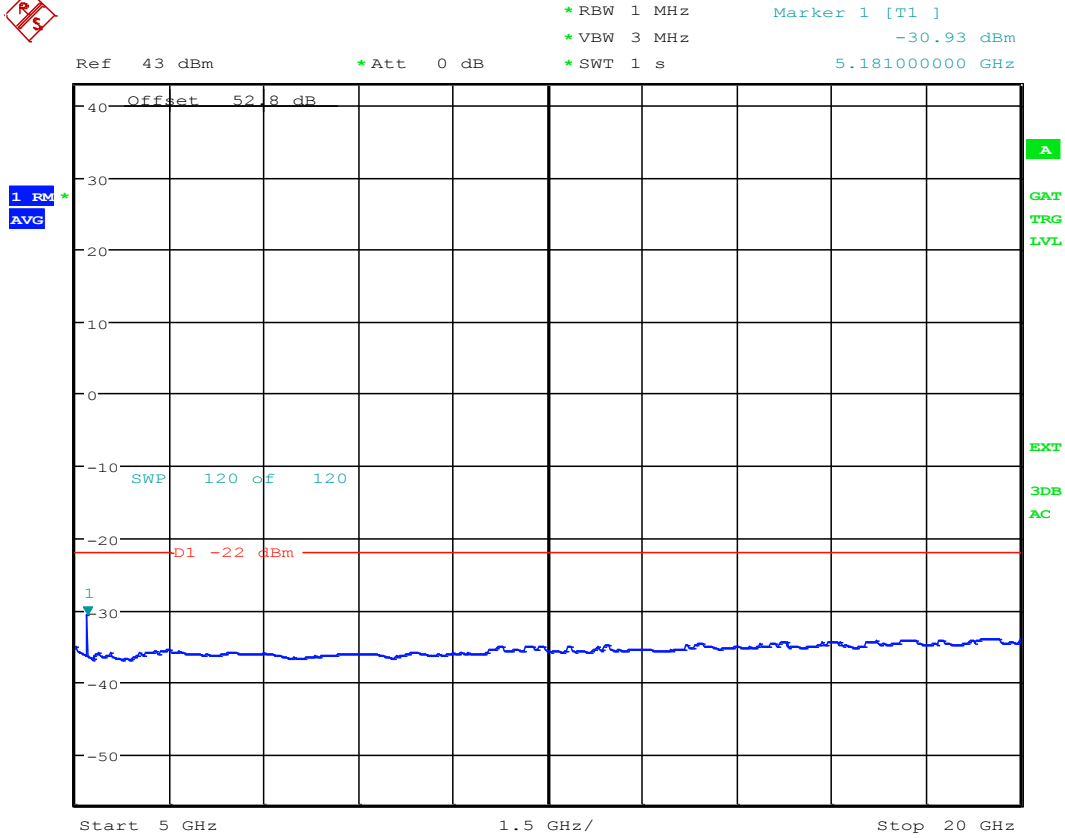
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 15:58:54

FCCID: AS5BBTRX-15



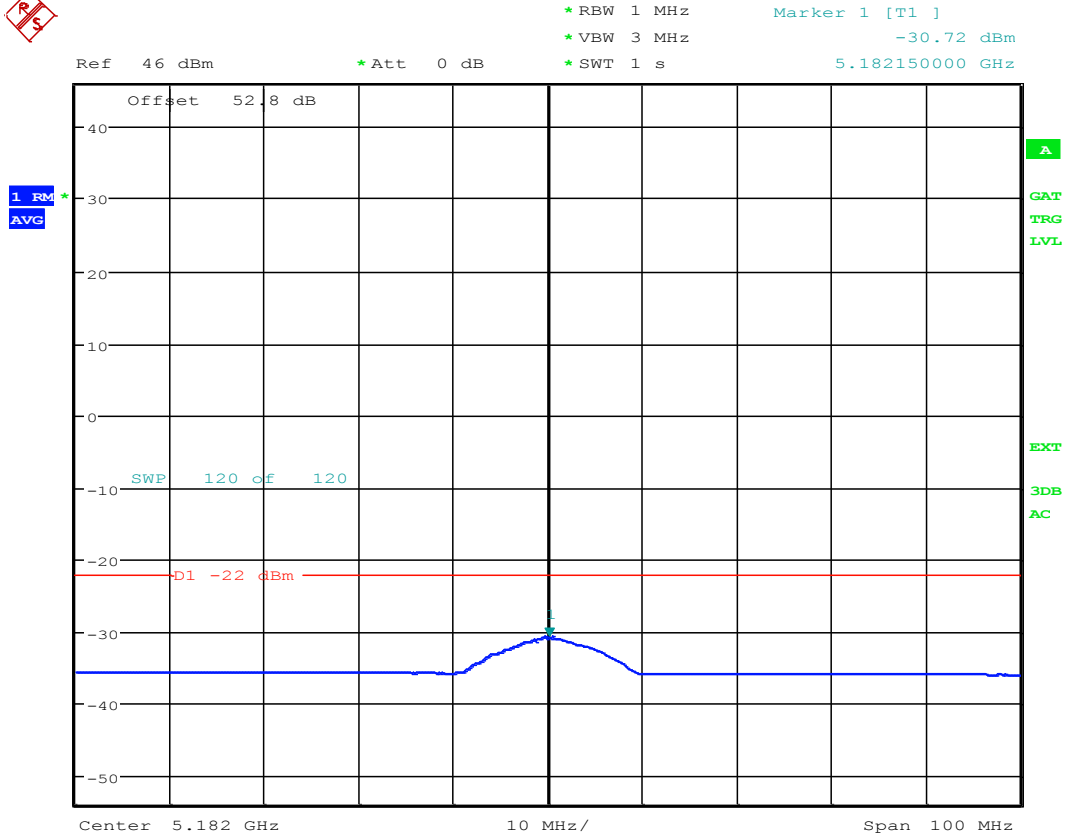
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 16:38:59

FCCID: AS5BBTRX-15



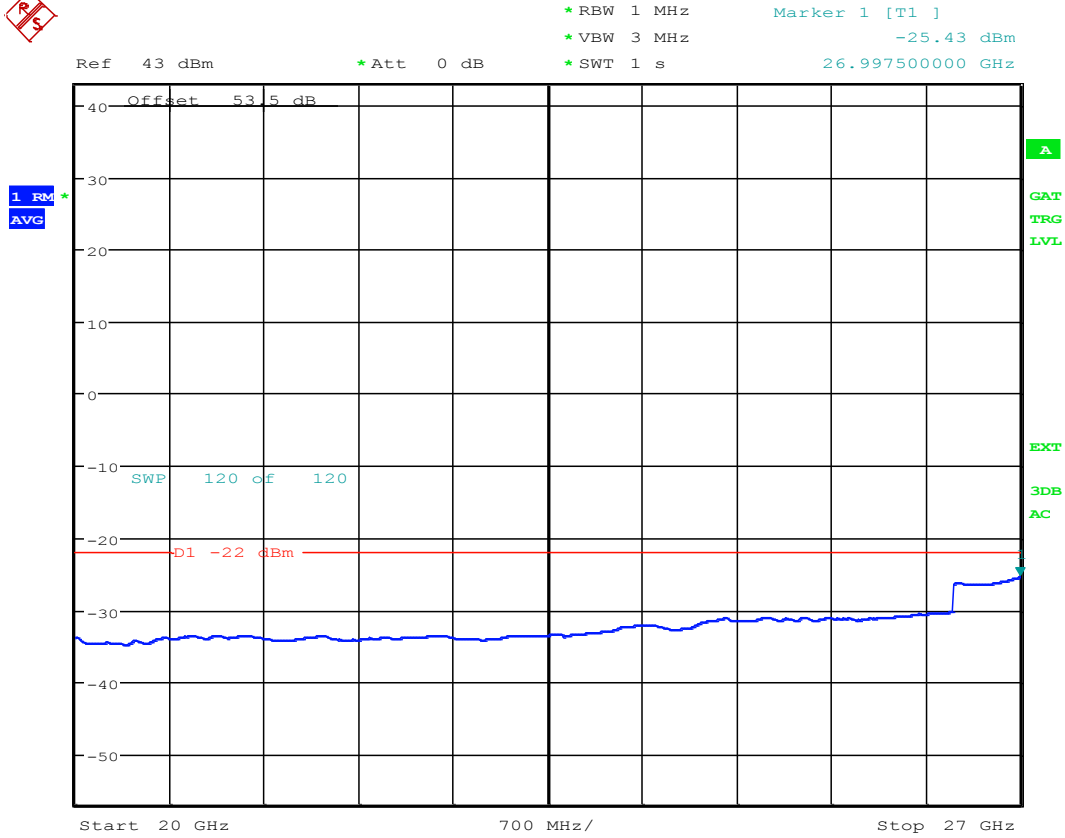
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 16:26:49

FCCID: AS5BBTRX-15



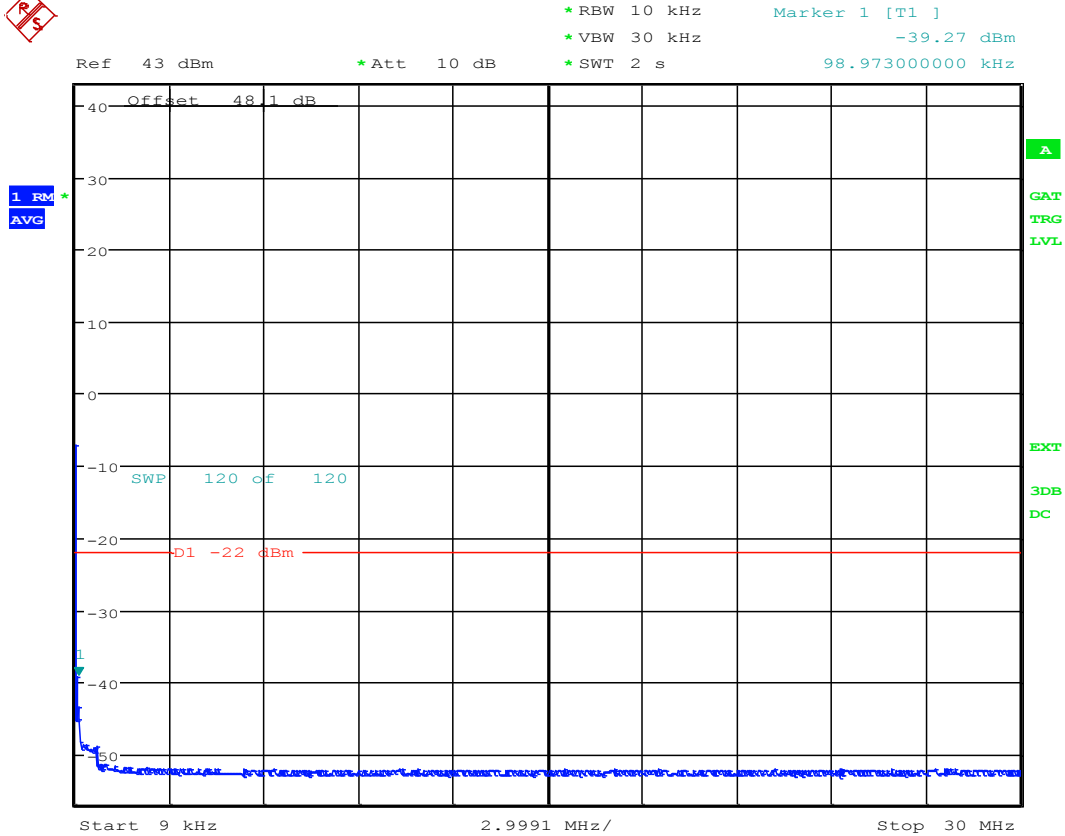
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 16:14:44

FCCID: AS5BBTRX-15



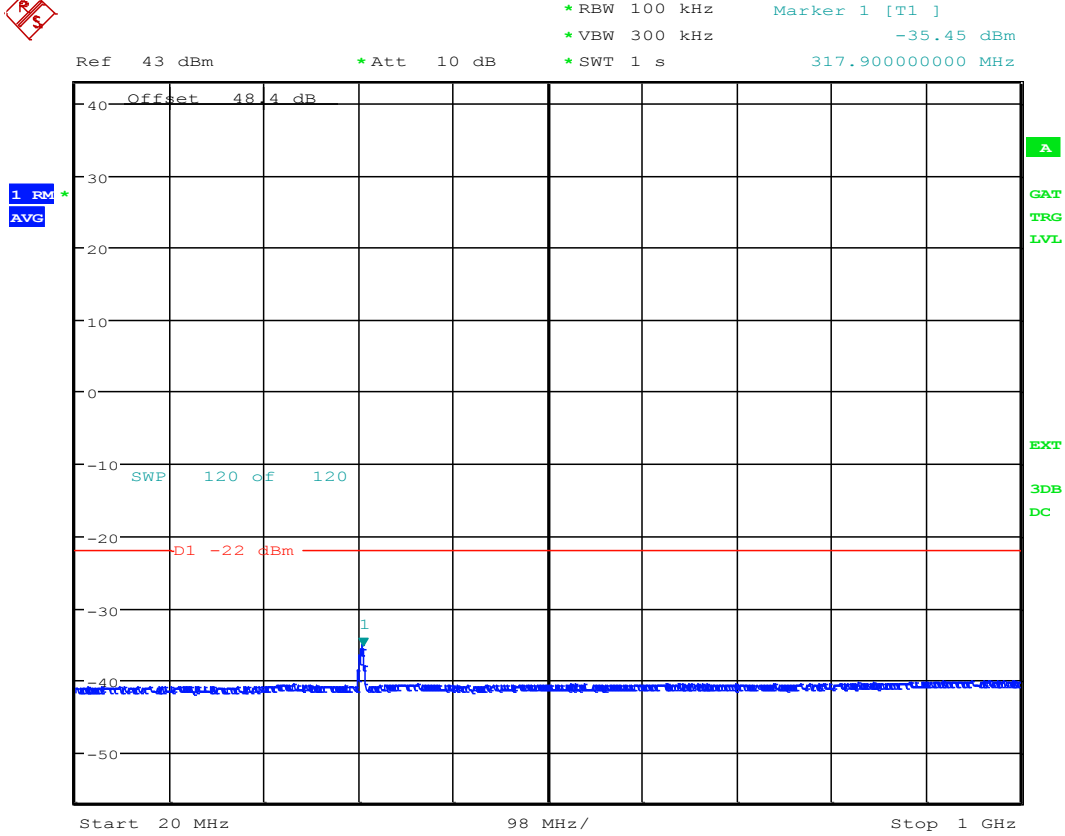
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2586-2596M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 16.MAY.2016 15:44:51

FCCID: AS5BBTRX-15



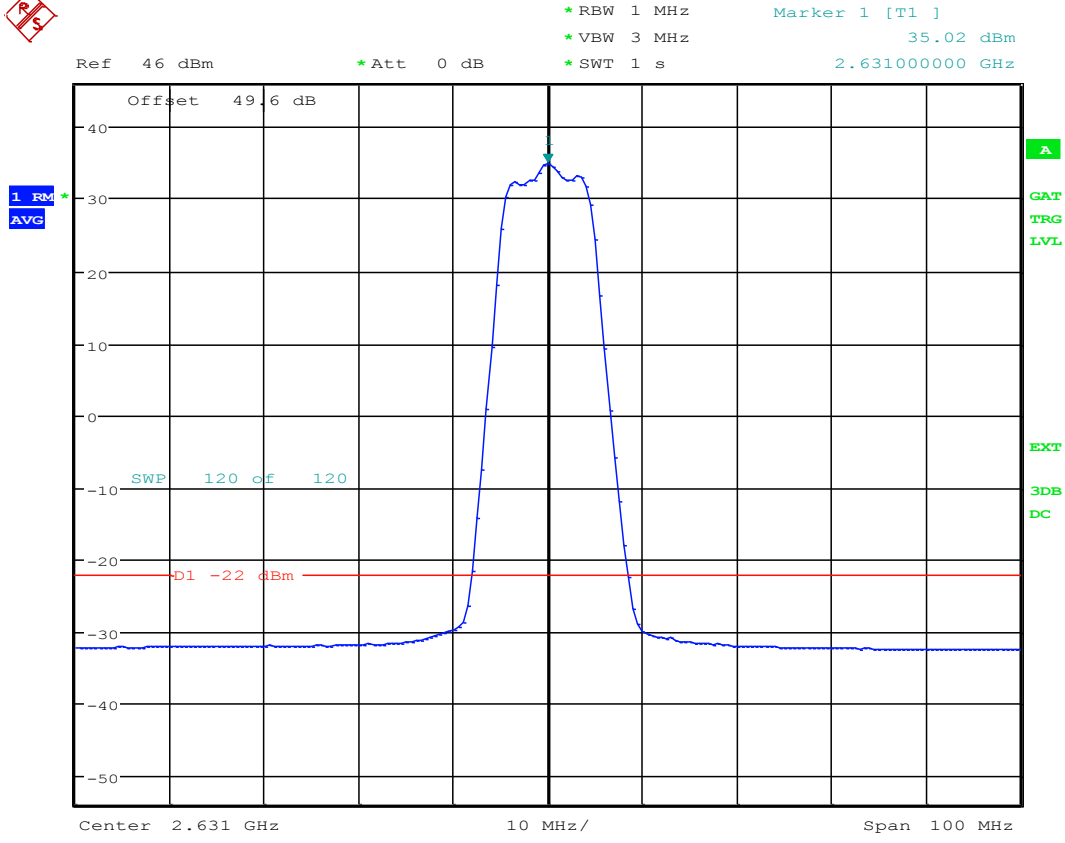
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A; CII
 Date: 18.MAY.2016 13:04:41

FCCID: AS5BBTRX-15



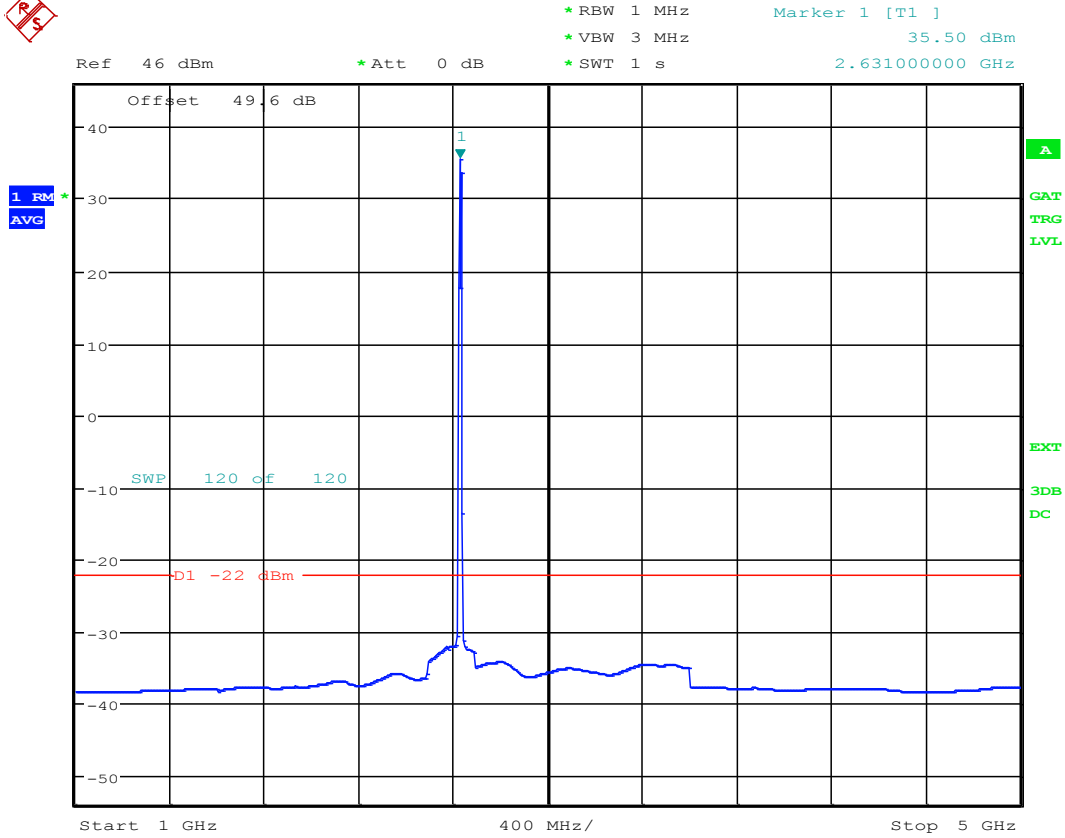
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 13:31:04

FCCID: AS5BBTRX-15



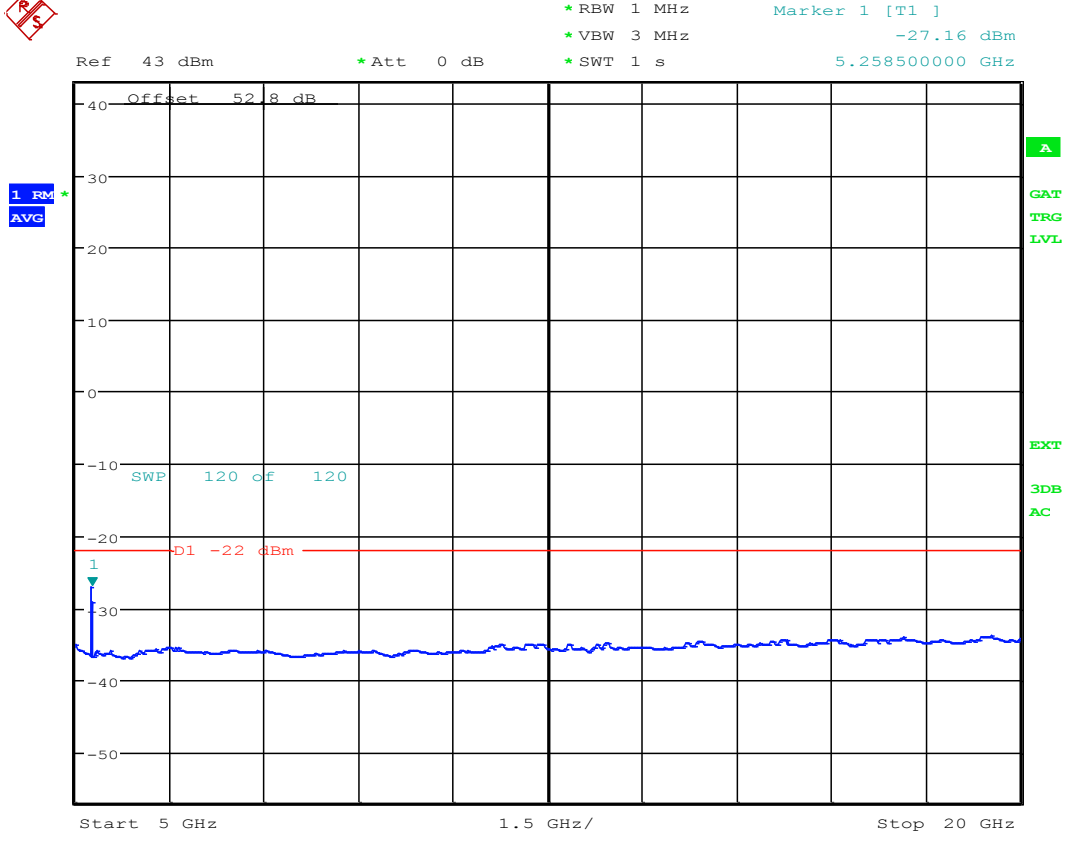
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
Date: 18.MAY.2016 14:07:12

FCCID: AS5BBTRX-15



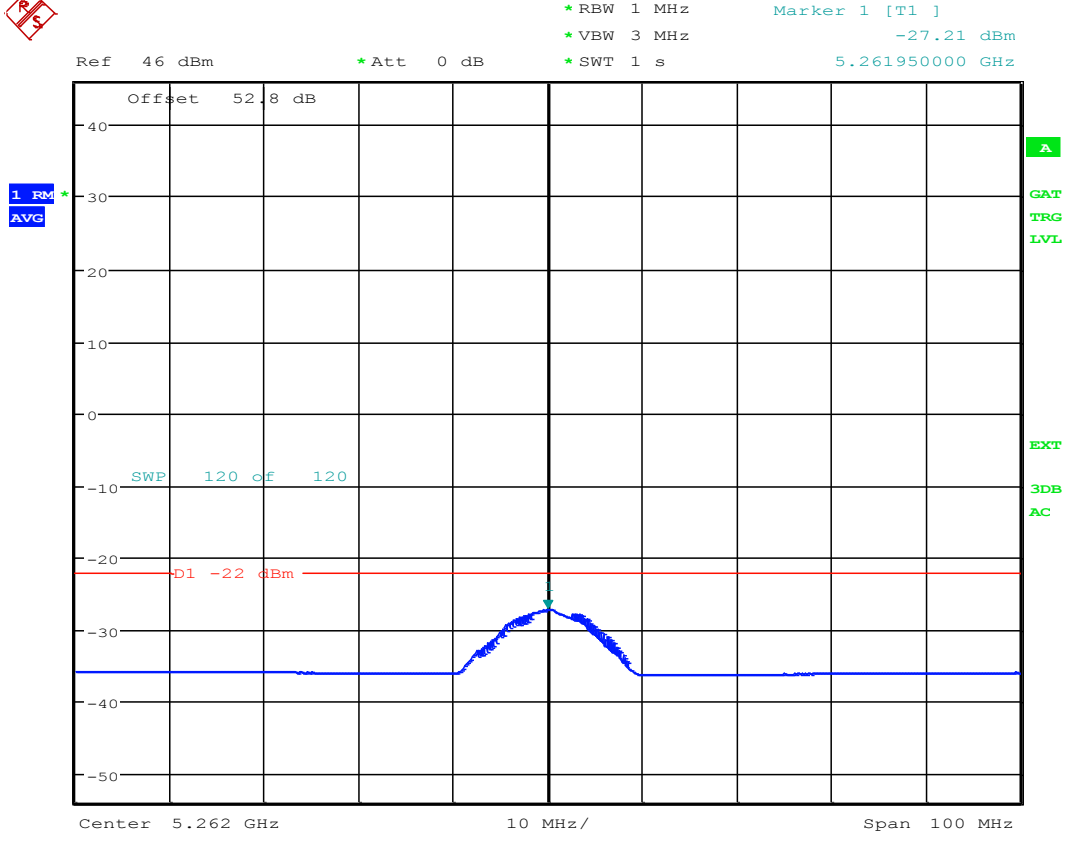
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 13:43:18

FCCID: AS5BBTRX-15



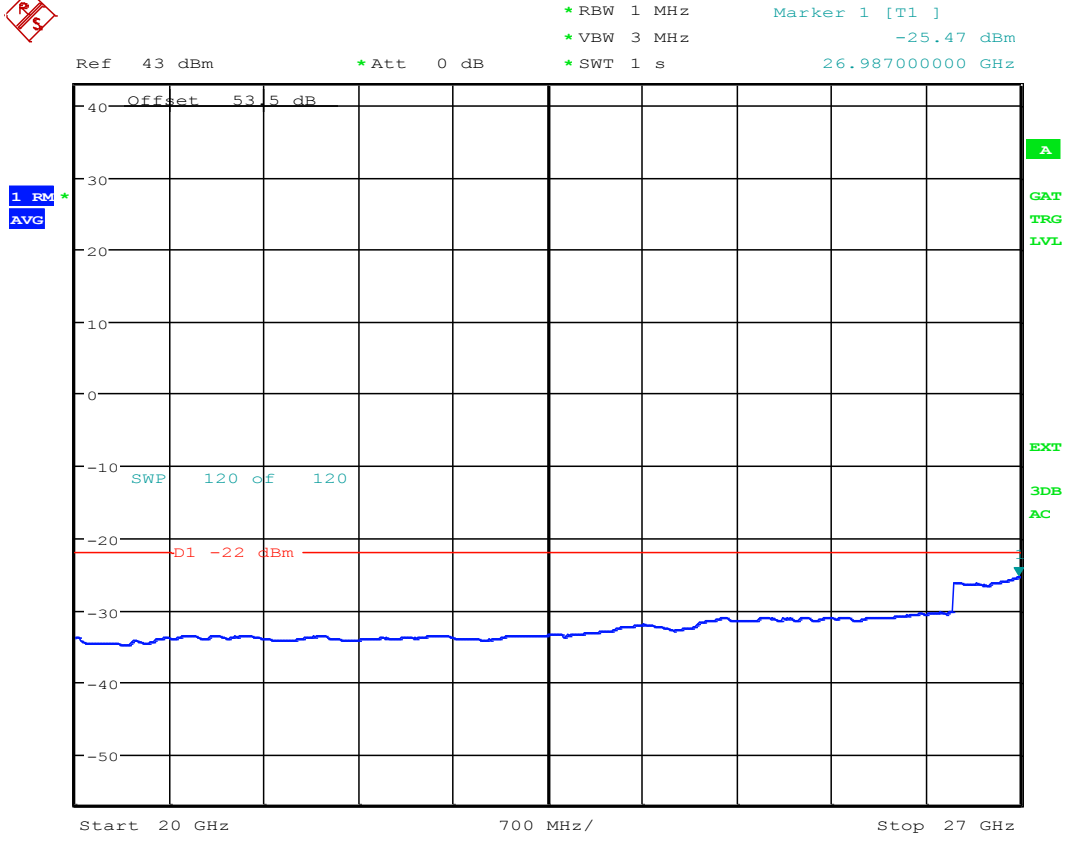
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 13:55:28

FCCID: AS5BBTRX-15



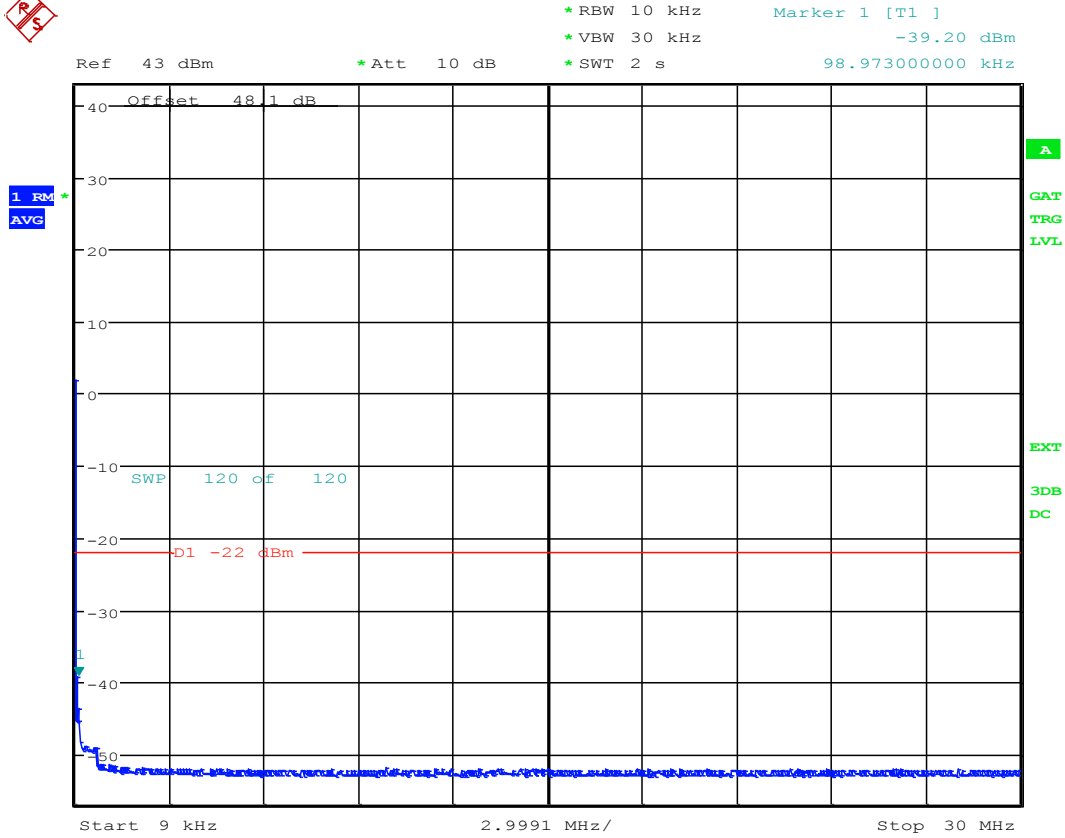
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 14:20:56

FCCID: AS5BBTRX-15



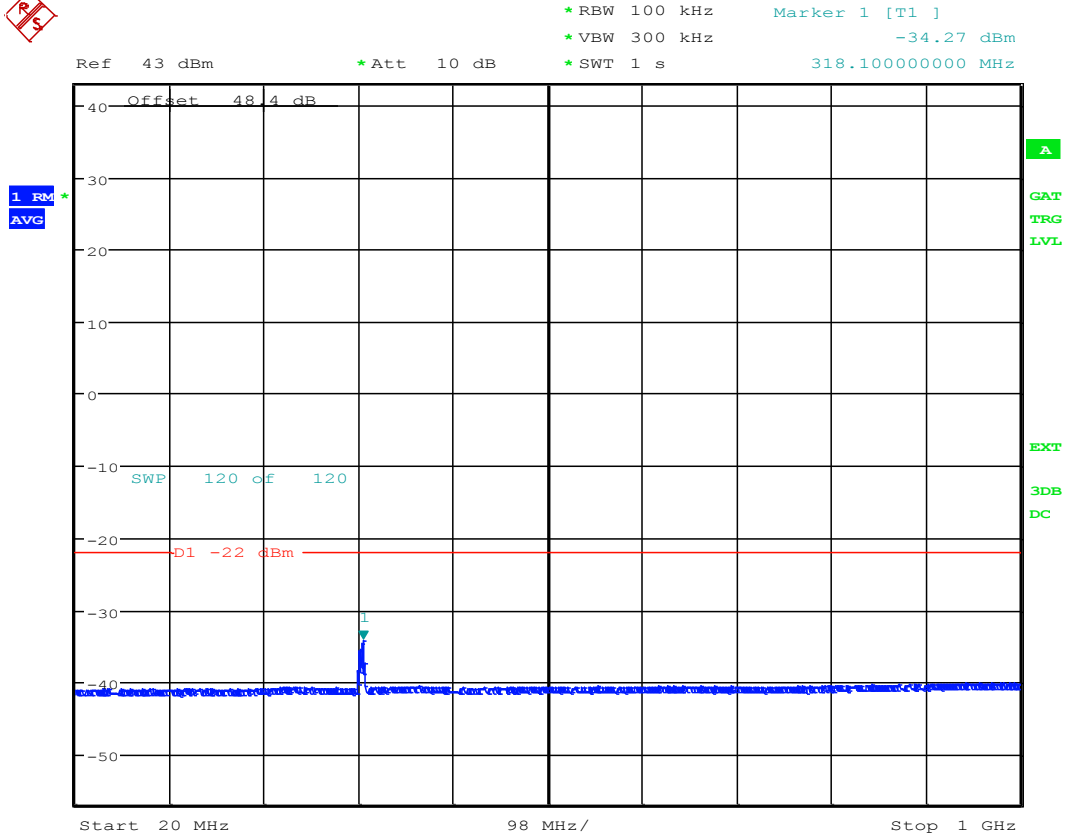
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;QPSK/16QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 14:32:54

FCCID: AS5BBTRX-15



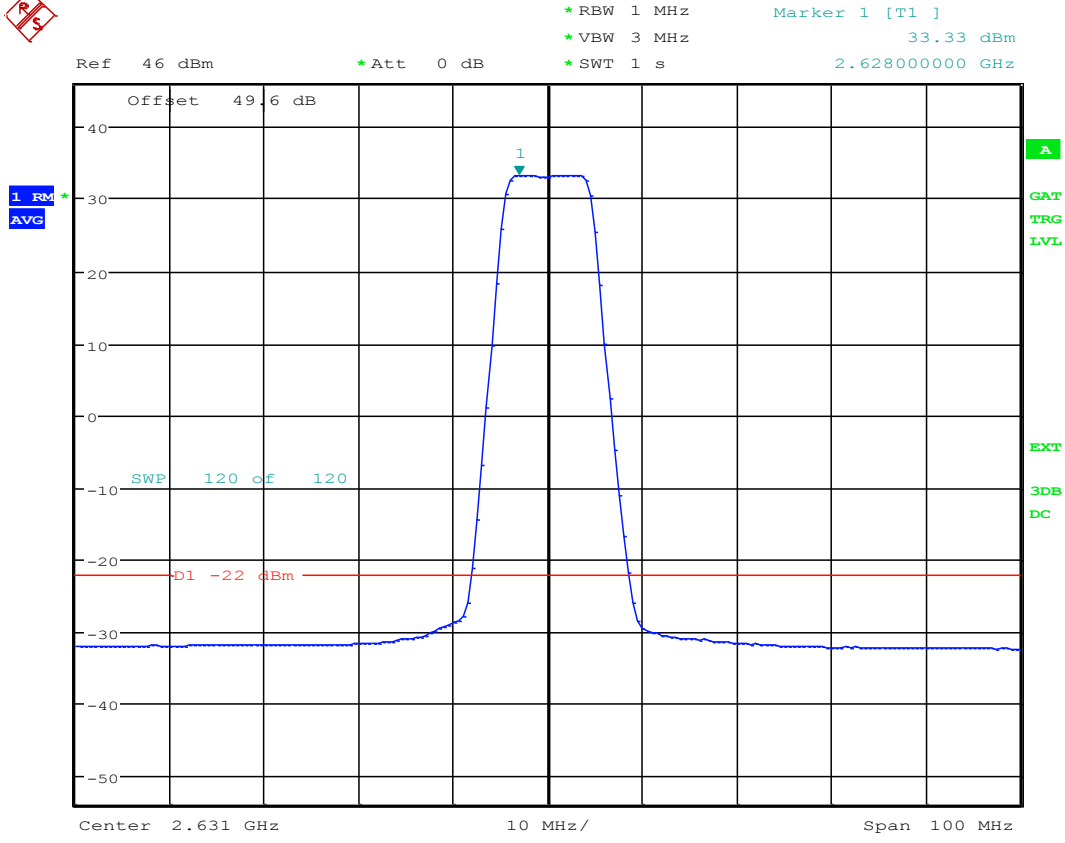
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 18.MAY.2016 15:52:19

FCCID: AS5BBTRX-15



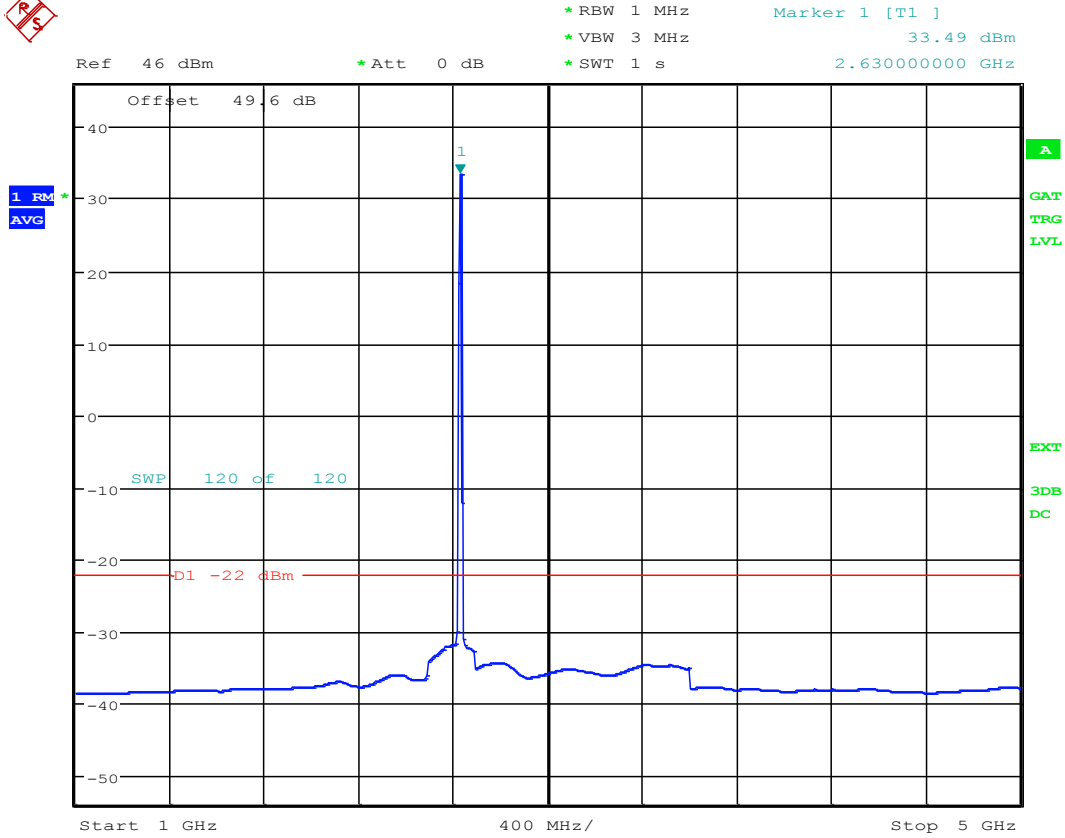
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 16:19:16

FCCID: AS5BBTRX-15



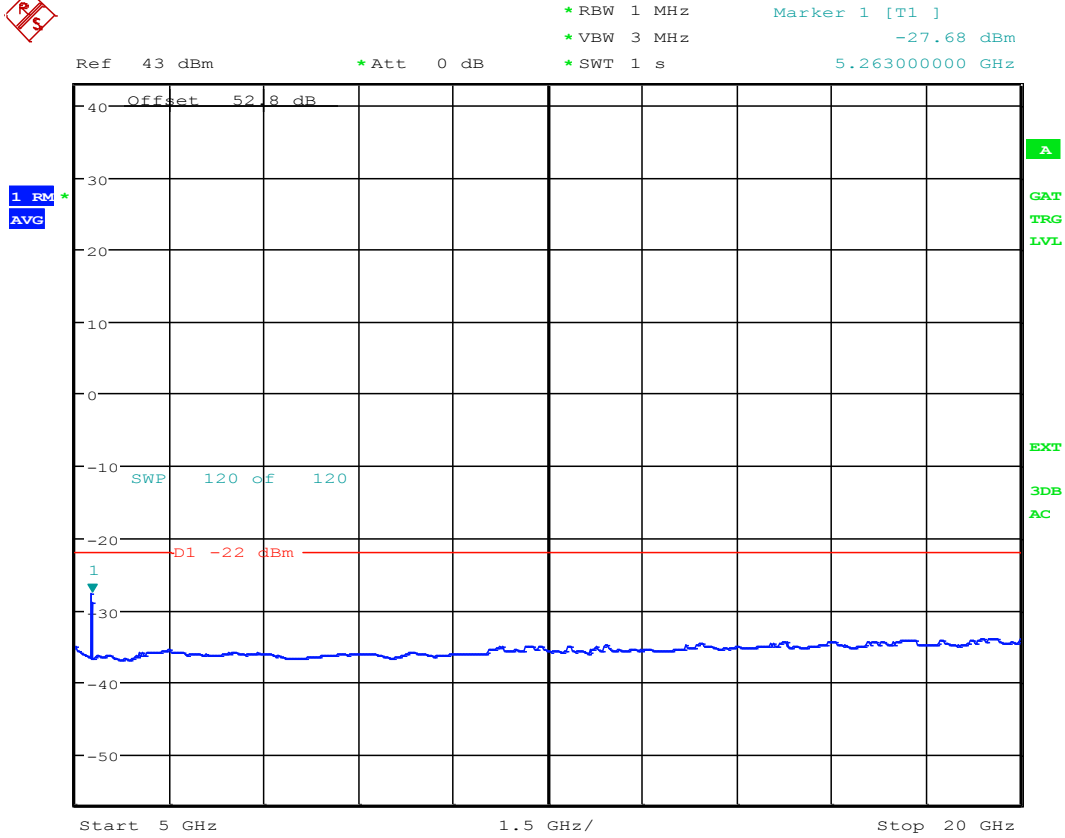
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 17:11:15

FCCID: AS5BBTRX-15



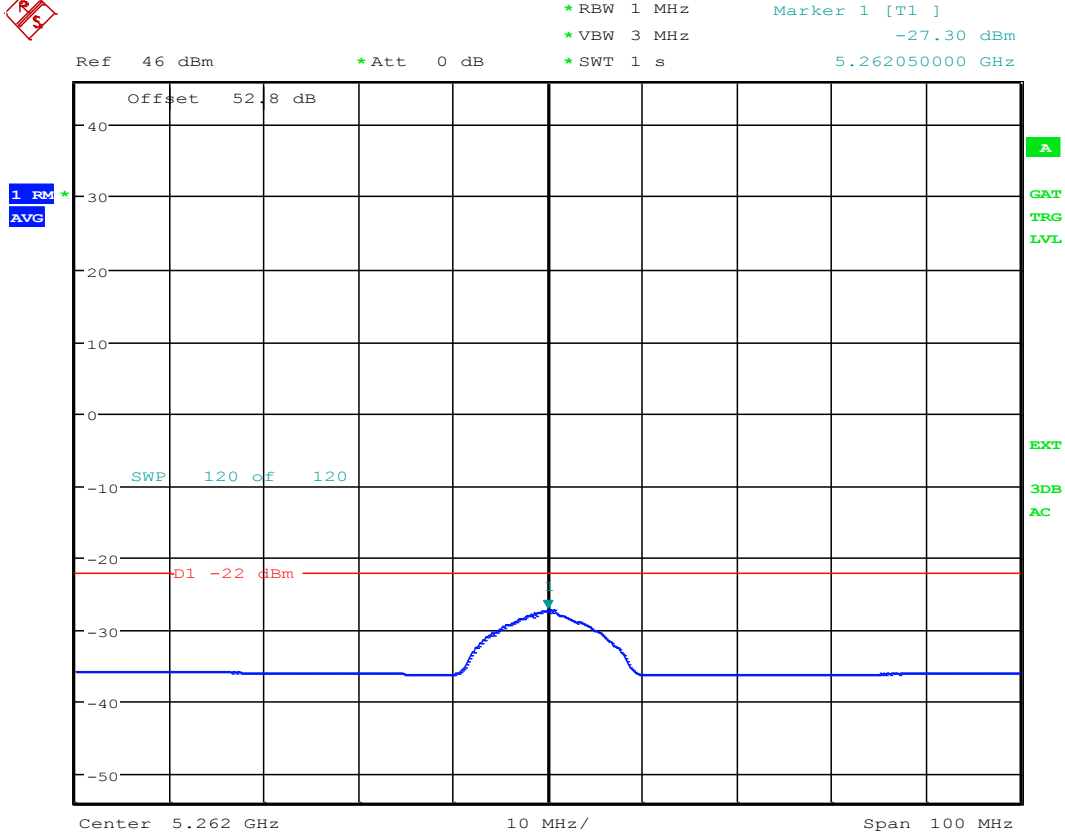
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A;CII
Date: 18.MAY.2016 16:34:50

FCCID: AS5BBTRX-15



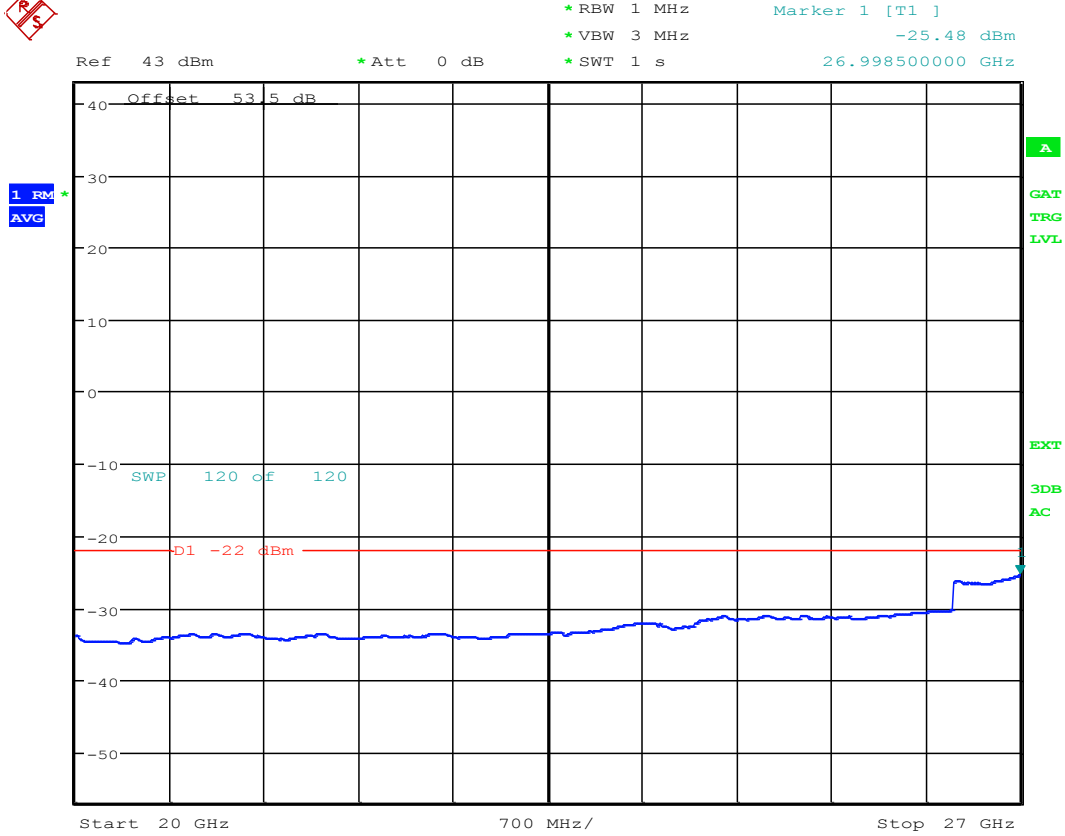
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 16:46:45

FCCID: AS5BBTRX-15



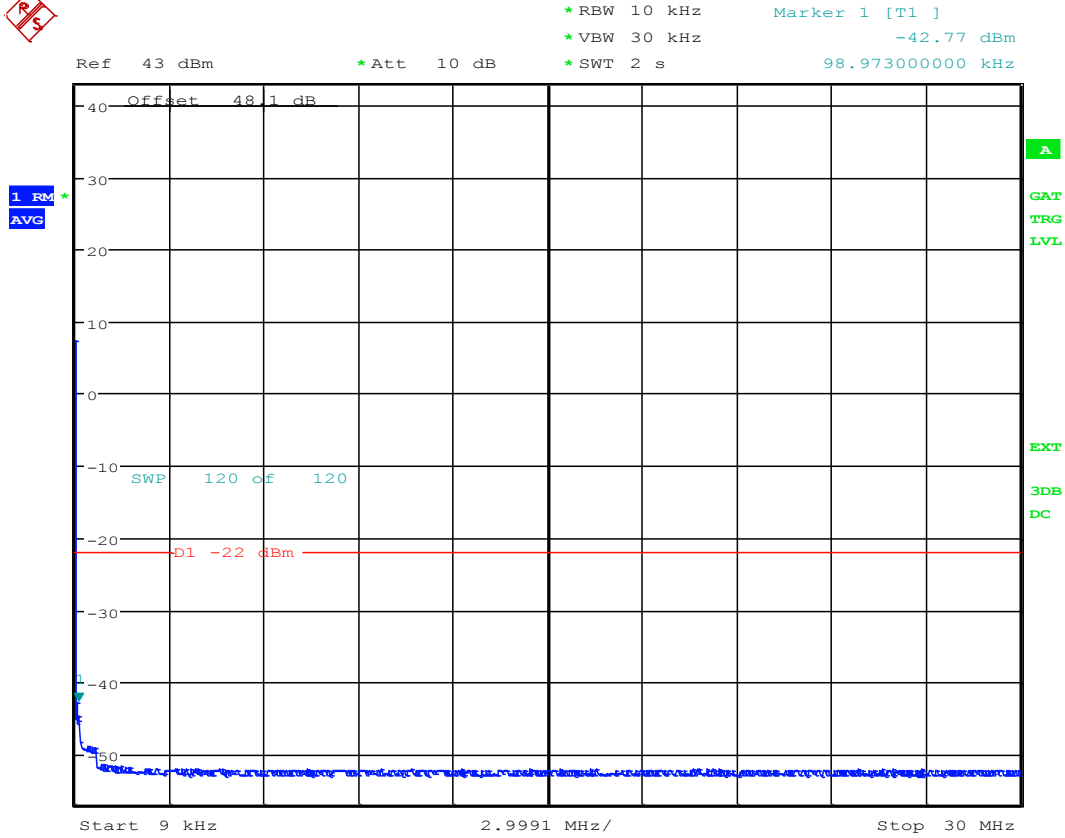
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 17:25:25

FCCID: AS5BBTRX-15



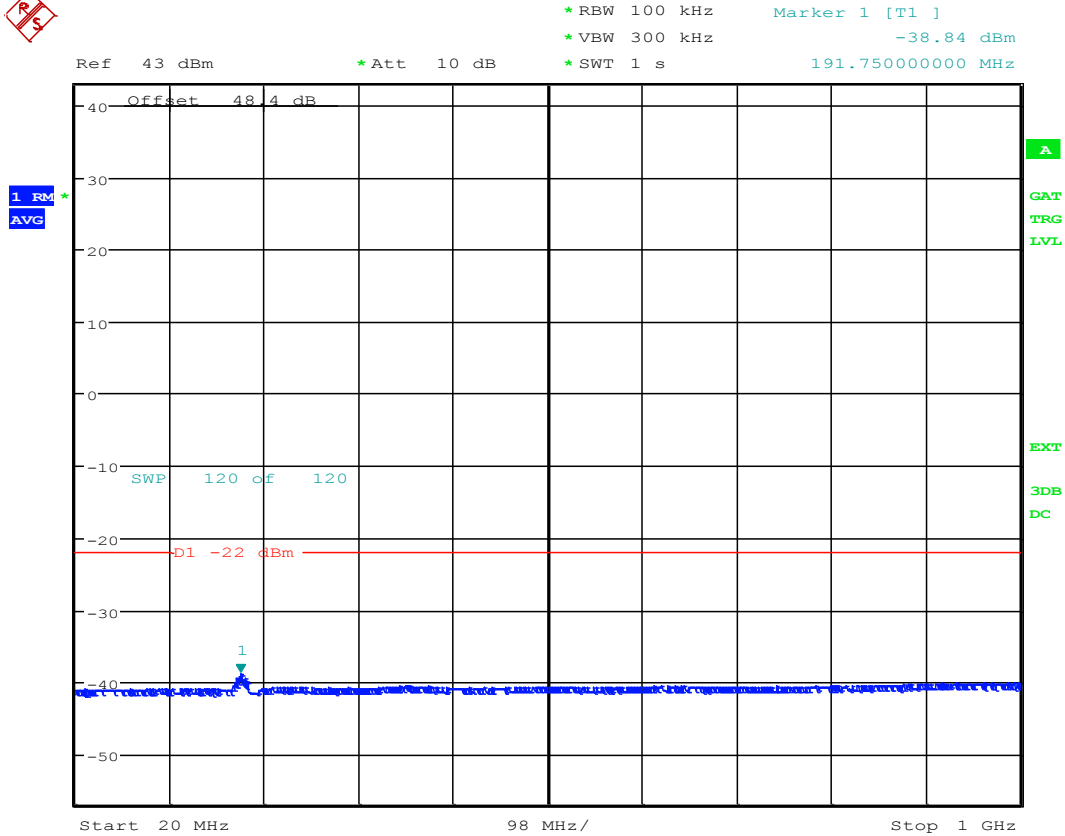
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20
 20W;10M BW;2626-2636M;64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 18.MAY.2016 16:59:26

FCCID: AS5BBTRX-15



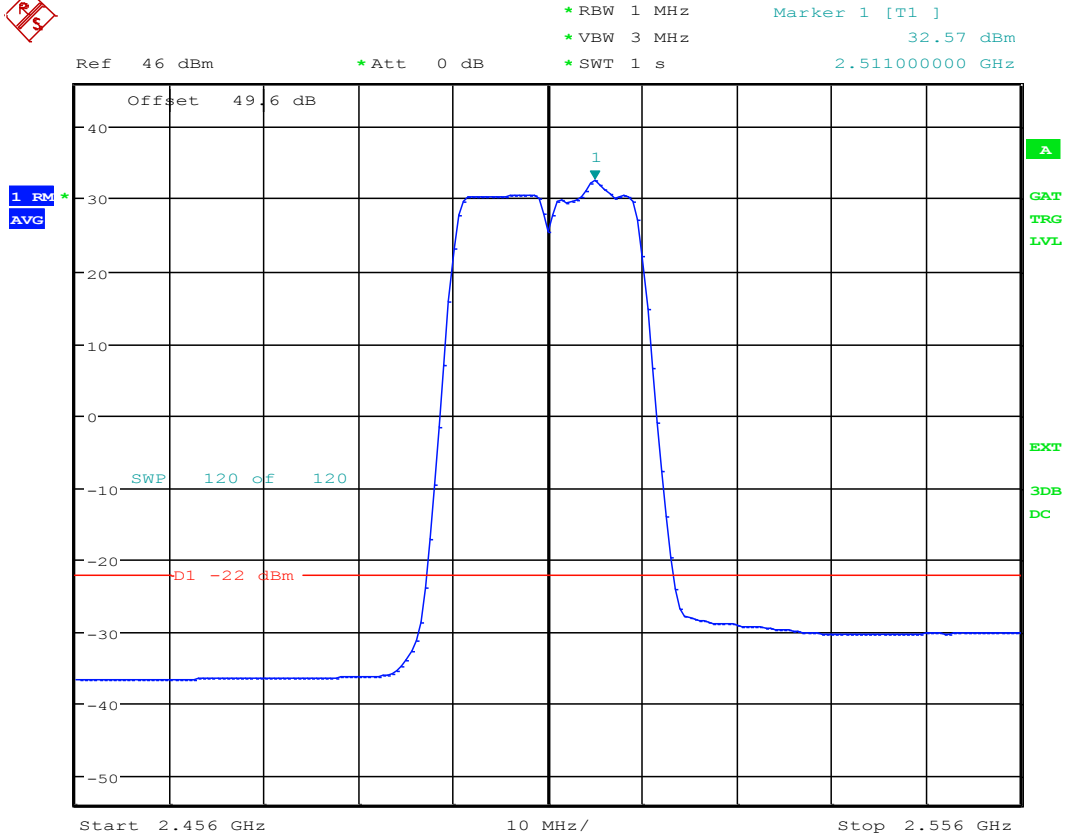
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 09:42:32

FCCID: AS5BBTRX-15



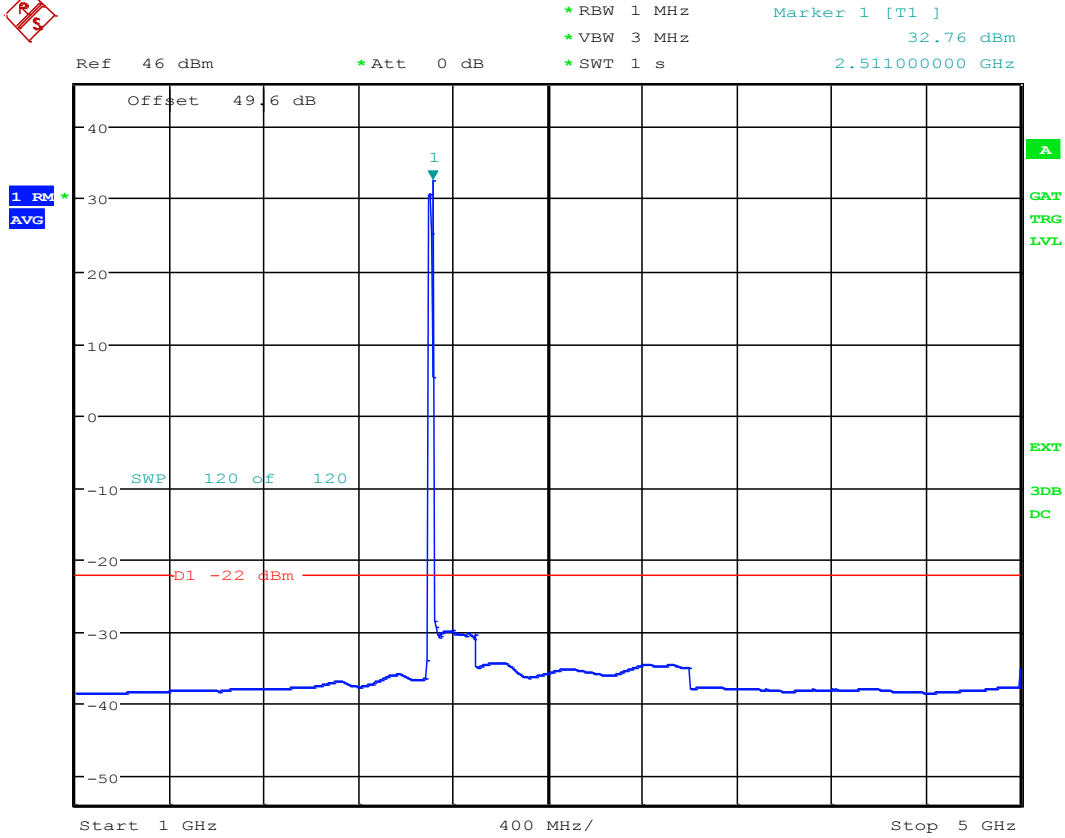
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20; 20W
 10+10M BW; 2496-2516M; QPSK/16QAM/64QAM; FCCID:AS5BBTRX-15A; CII
 Date: 25.MAY.2016 09:55:08

FCCID: AS5BBTRX-15



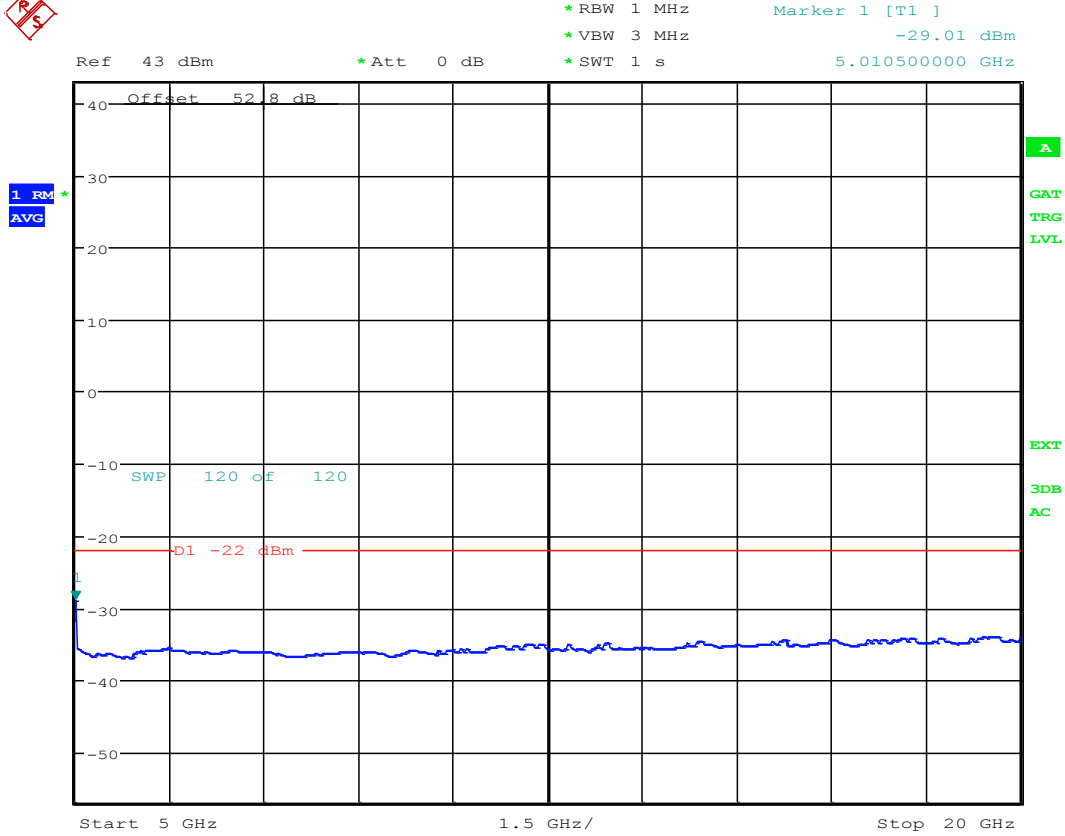
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
10+10M BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
Date: 25.MAY.2016 10:35:05

FCCID: AS5BBTRX-15



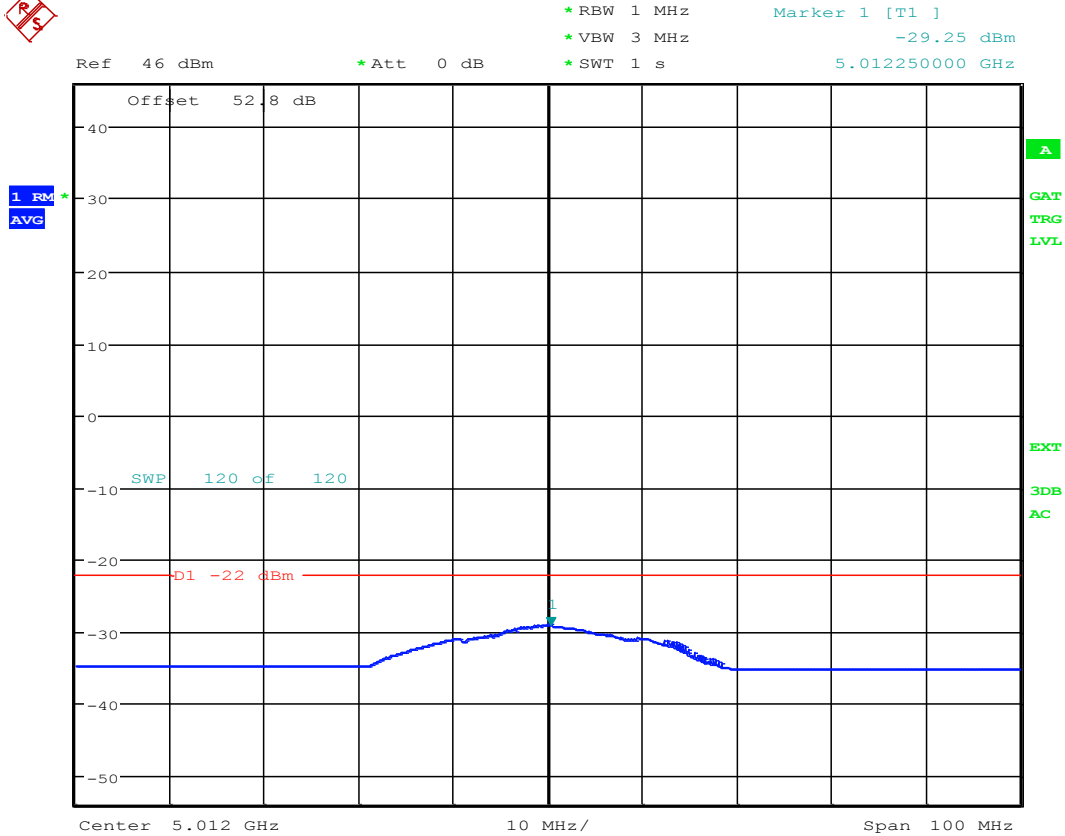
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 10:08:33

FCCID: AS5BBTRX-15



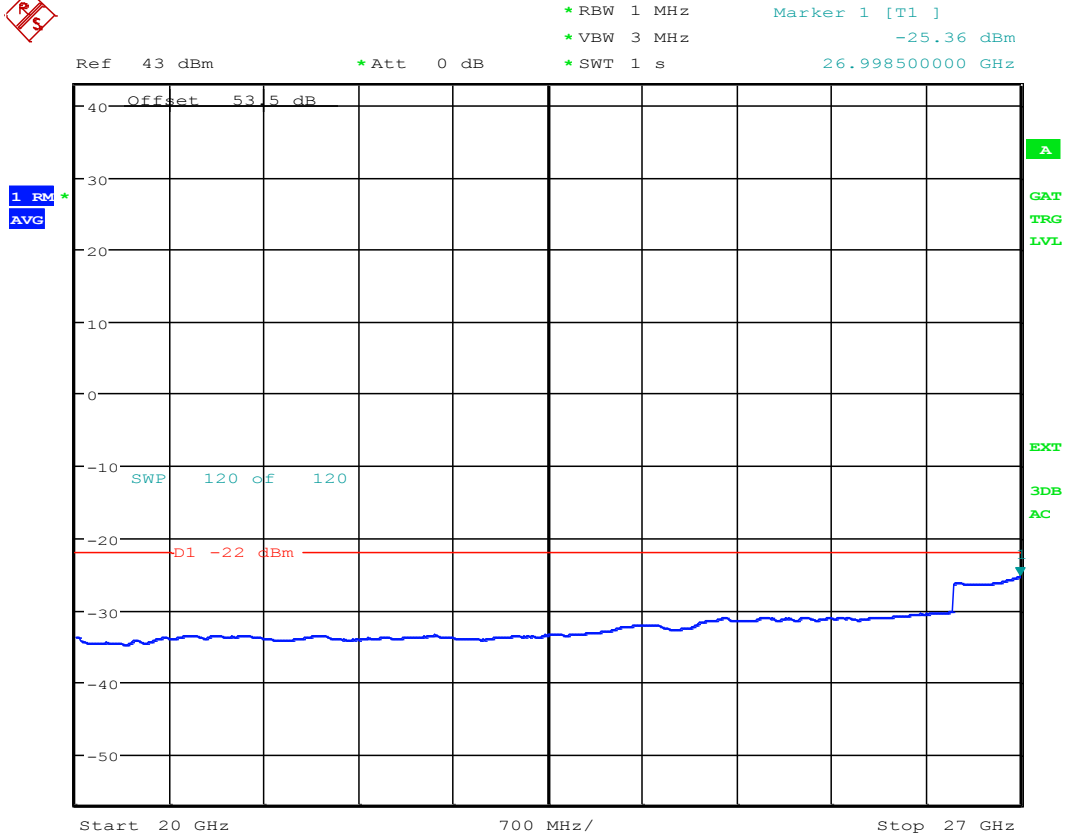
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
10+10M BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
Date: 25.MAY.2016 10:20:21

FCCID: AS5BBTRX-15



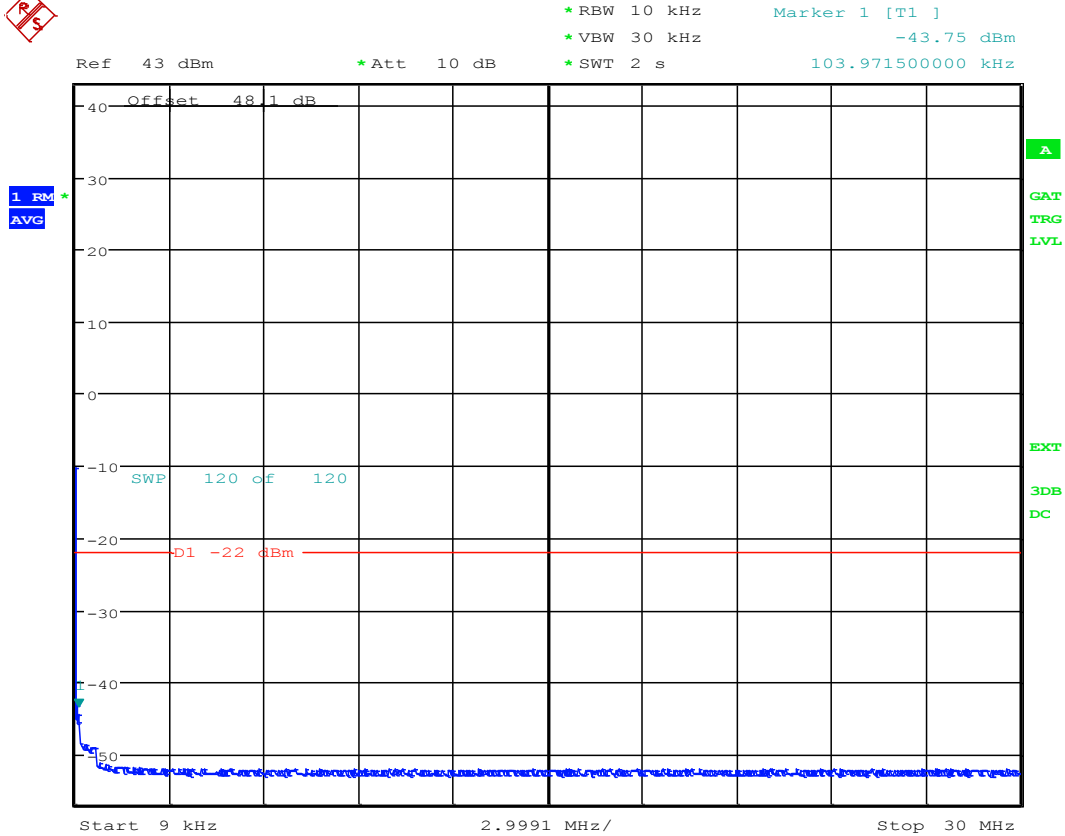
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 10:48:03

FCCID: AS5BBTRX-15



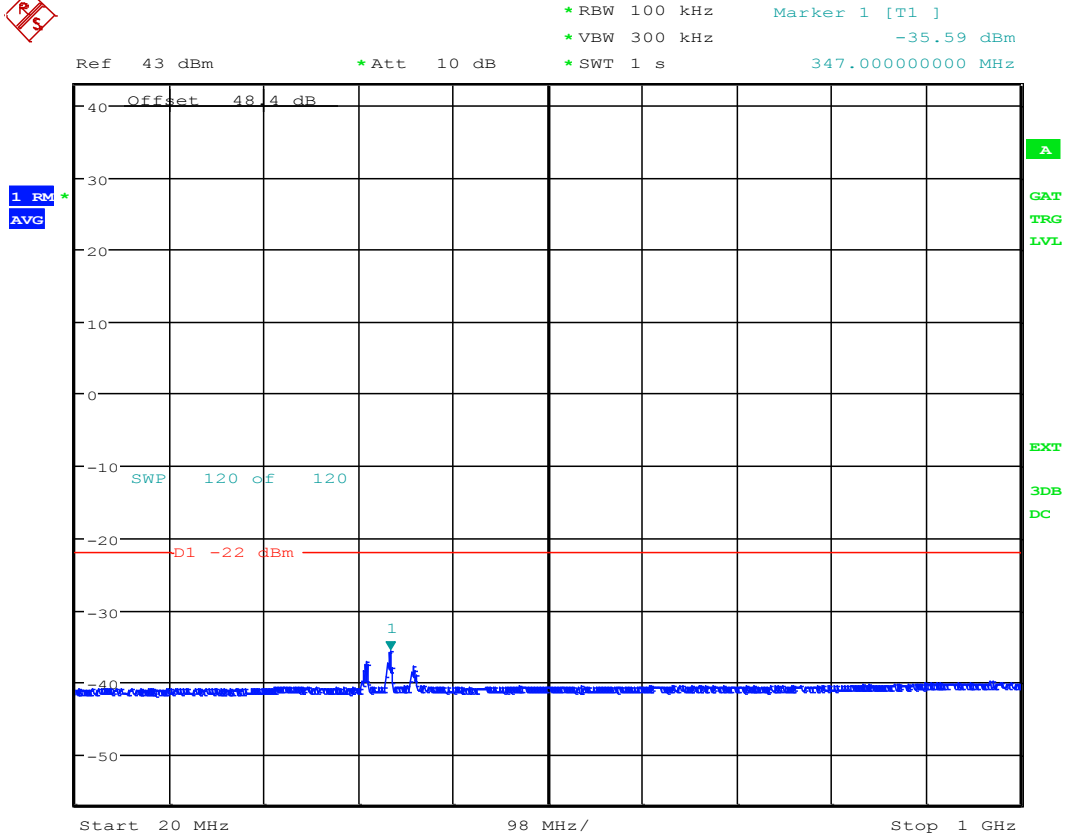
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2496-2516M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 16:29:12

FCCID: AS5BBTRX-15



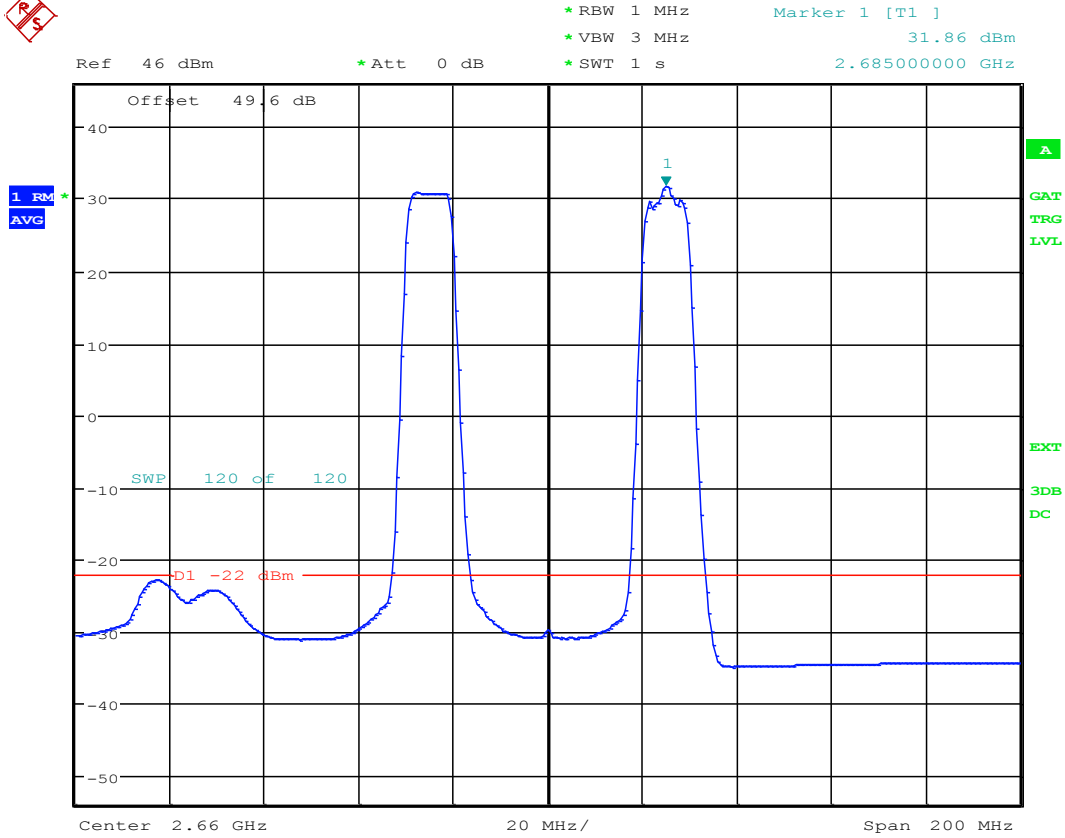
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2635-2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A; CI
 I
 Date: 25.MAY.2016 14:18:03

FCCID: AS5BBTRX-15



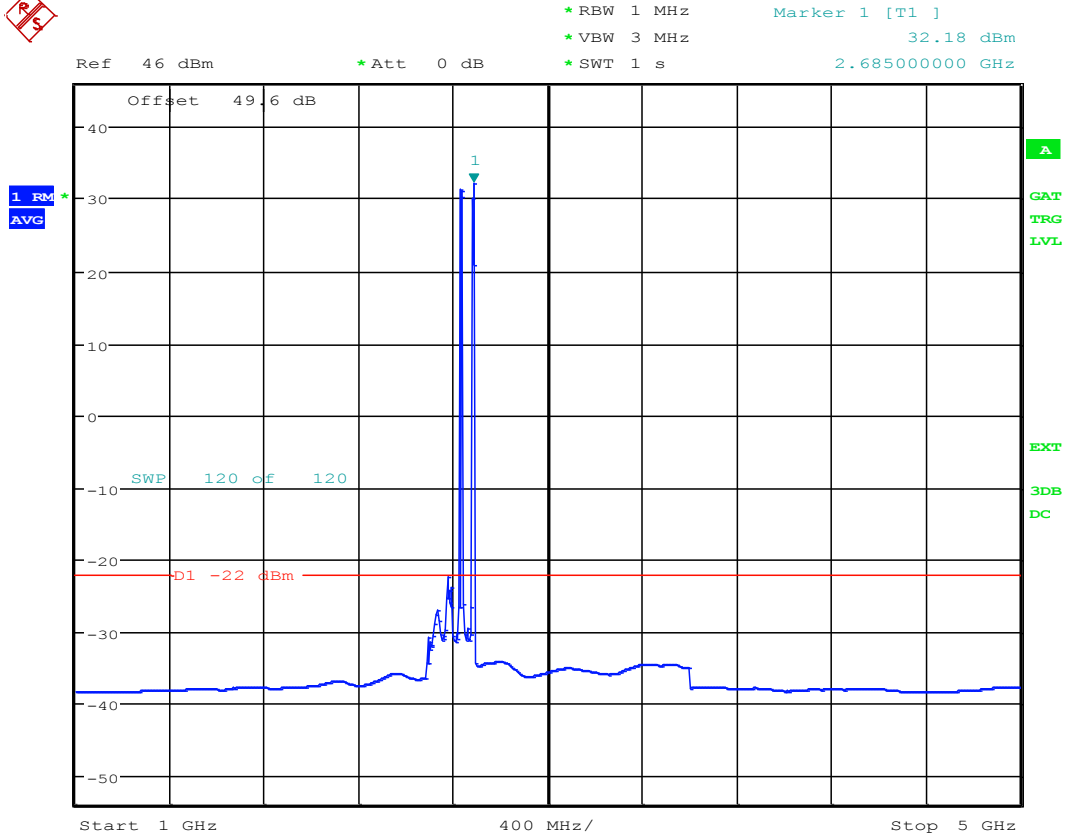
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2635-2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 14:41:49

FCCID: AS5BBTRX-15



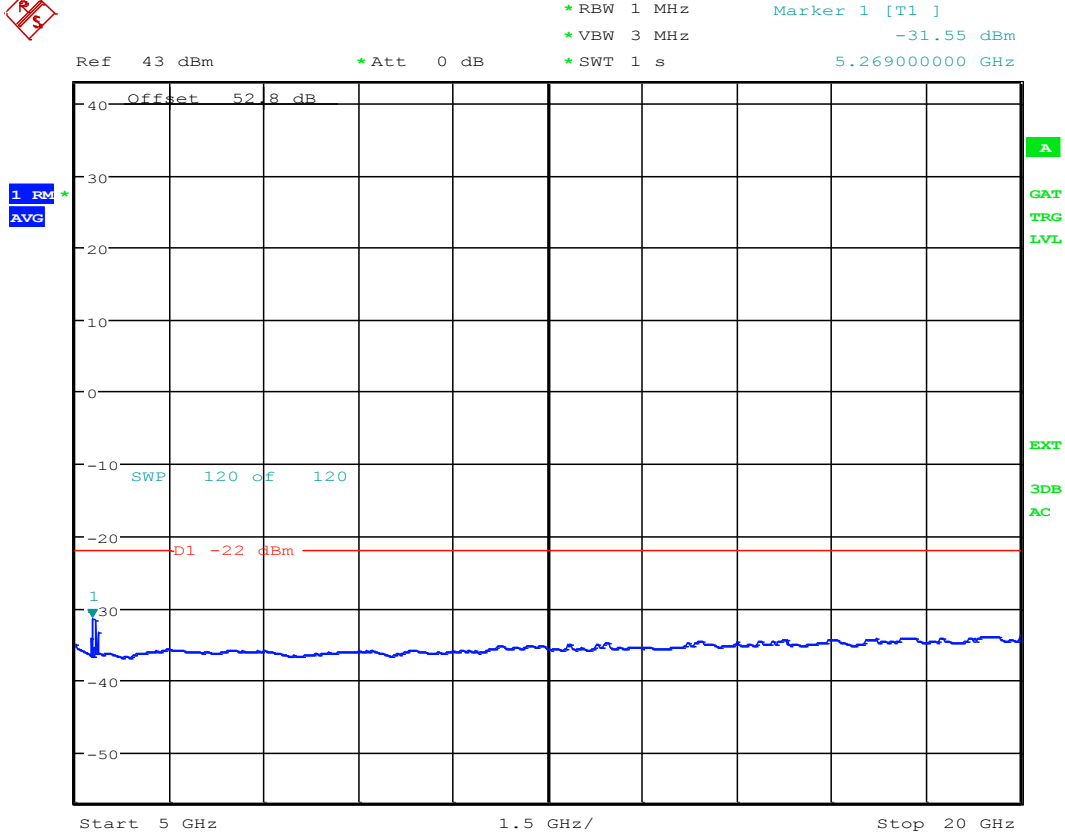
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
10+10M BW;2635&2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
Date: 25.MAY.2016 15:51:17

FCCID: AS5BBTRX-15



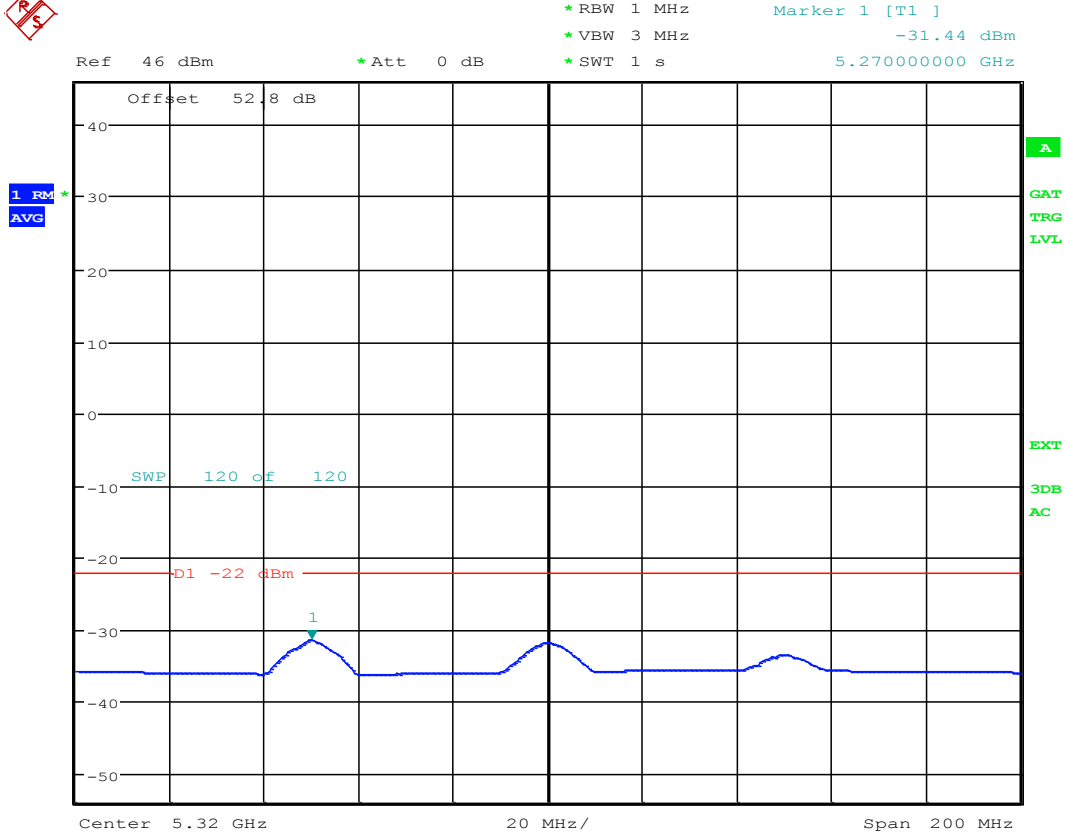
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2635-2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 15:24:18

FCCID: AS5BBTRX-15



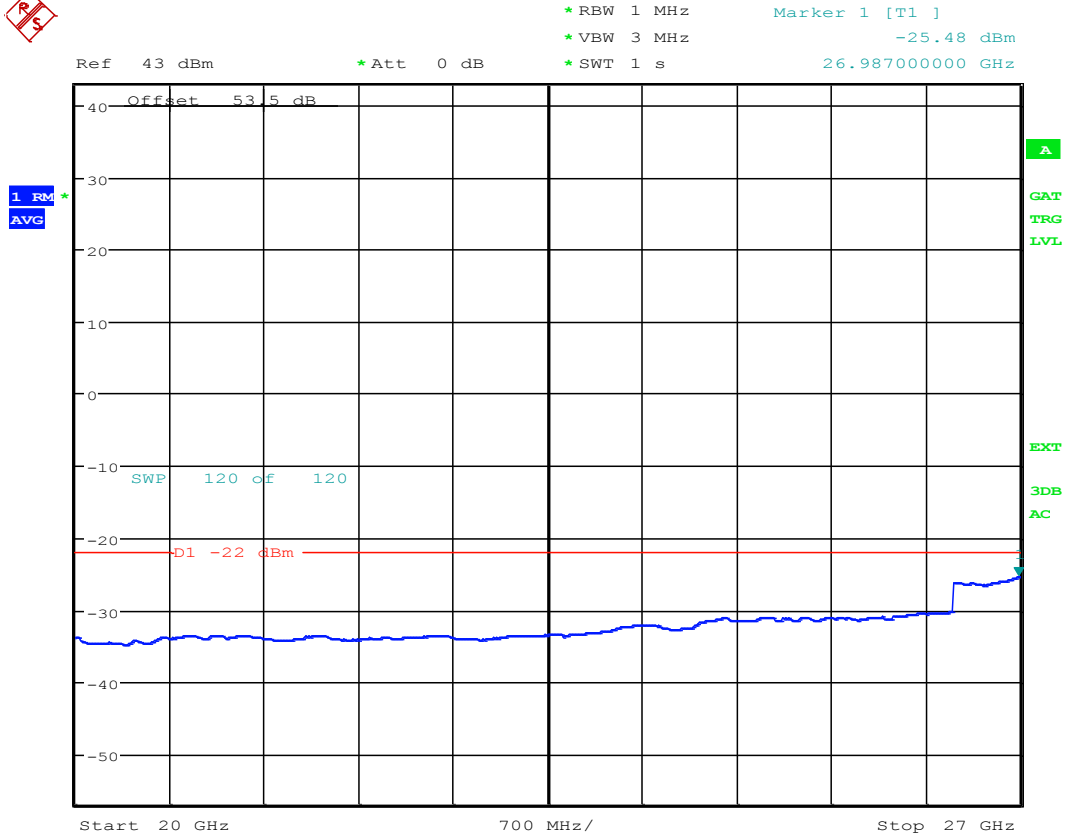
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2635&2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 15:36:08

FCCID: AS5BBTRX-15



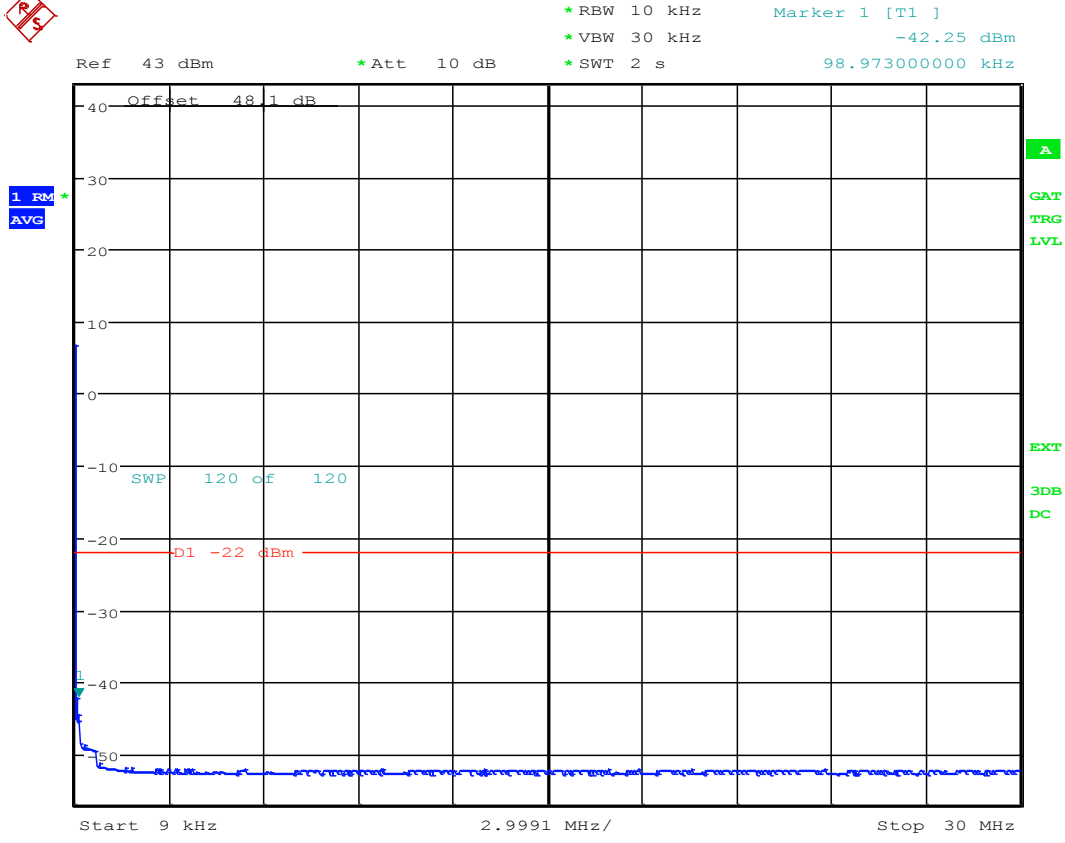
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2635&2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 16:07:08

FCCID: AS5BBTRX-15

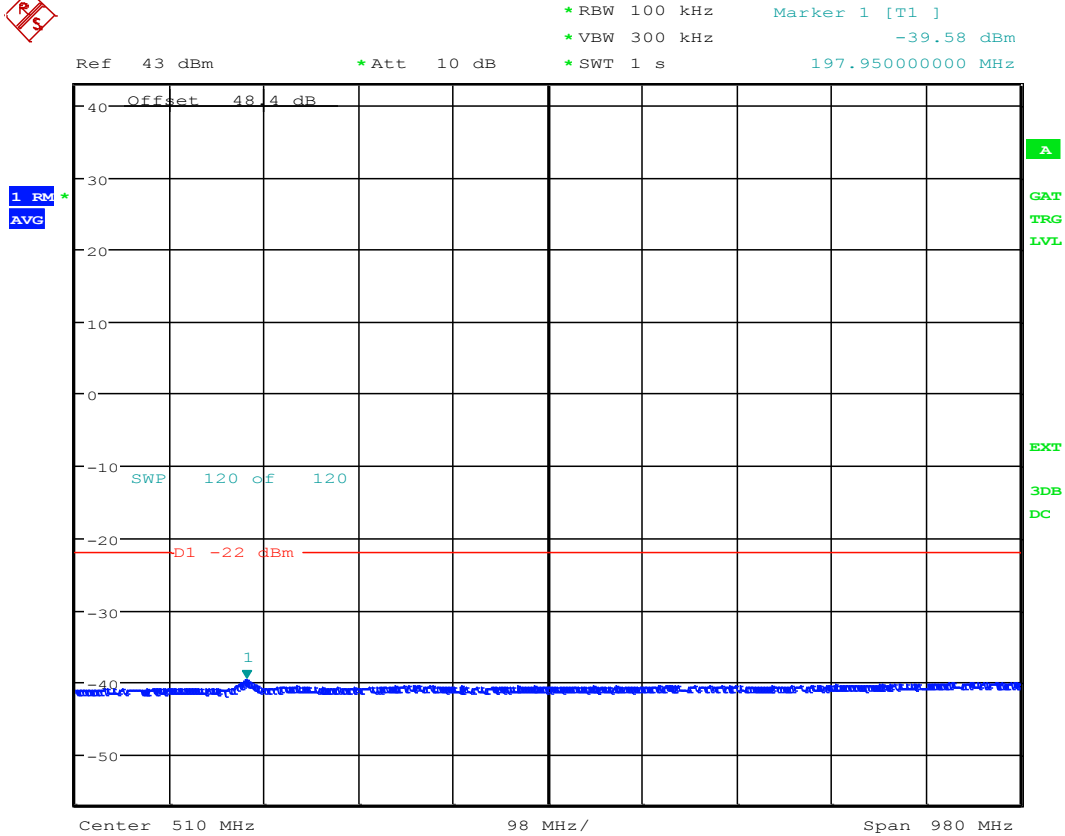


TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10M BW;2635&2685M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 25.MAY.2016 16:20:10

FCCID: AS5BBTRX-15

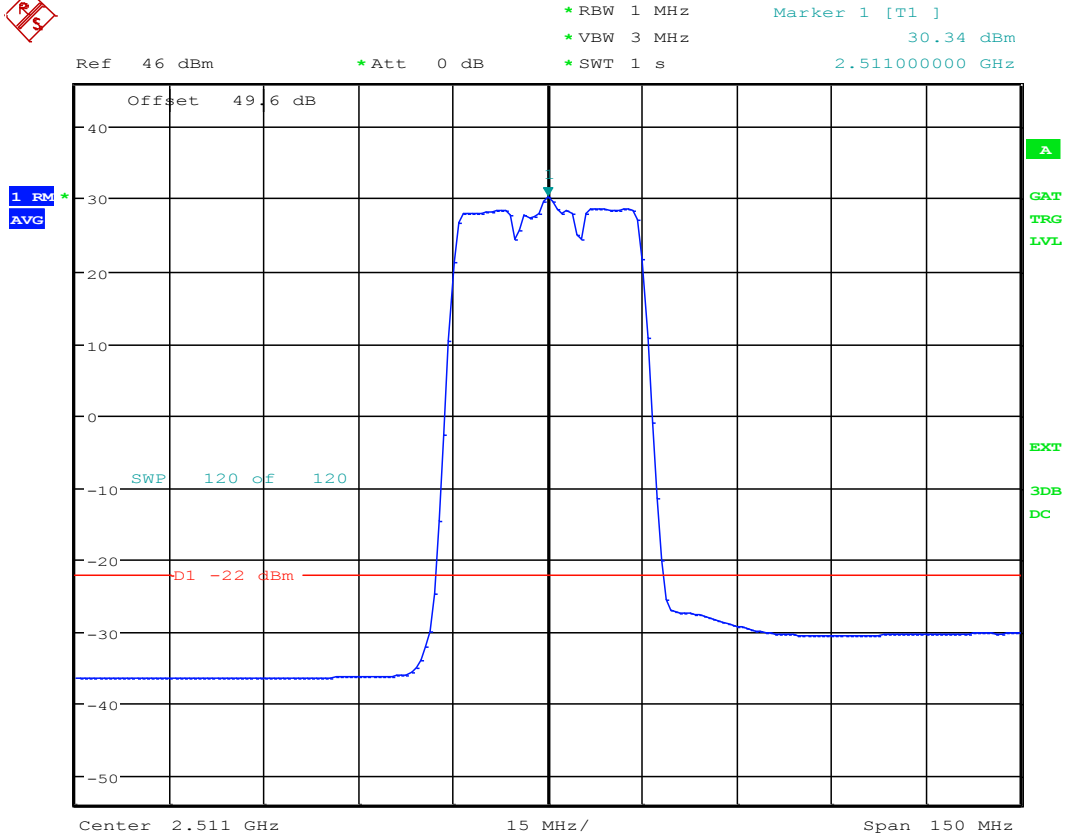


TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 26.MAY.2016 09:33:13
 FCCID: AS5BBTRX-15



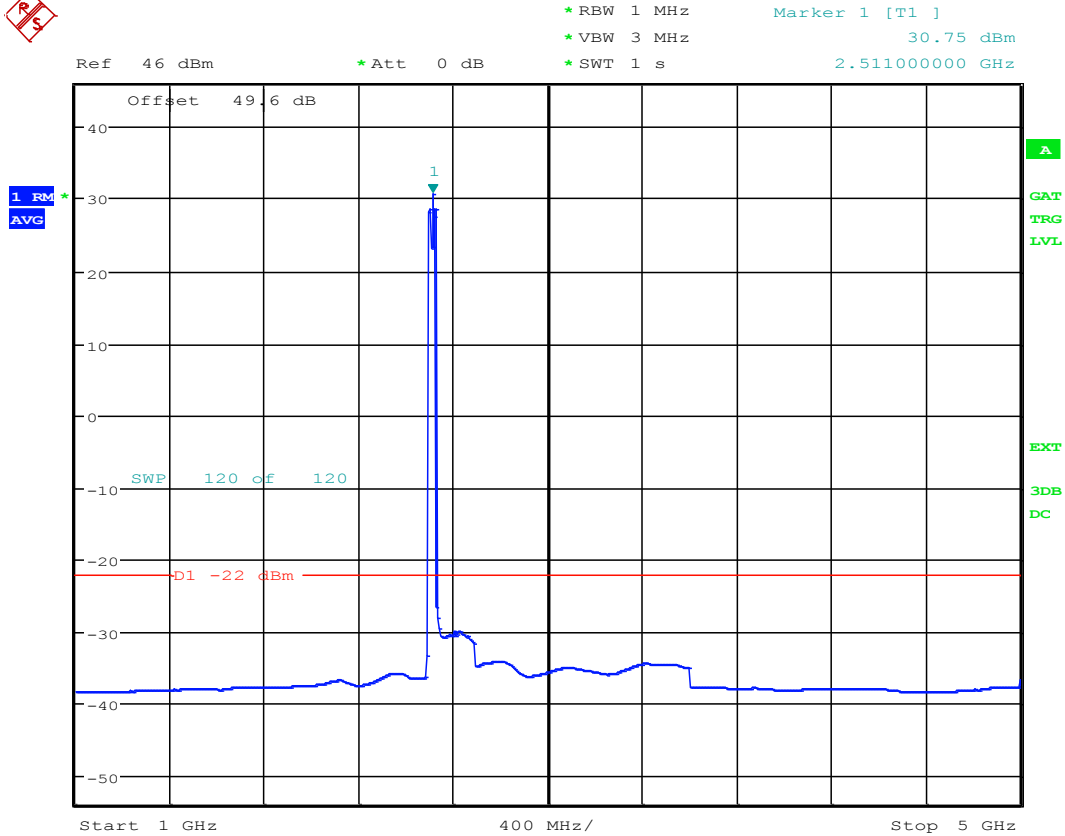
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 25.MAY.2016 17:42:30

FCCID: AS5BBTRX-15



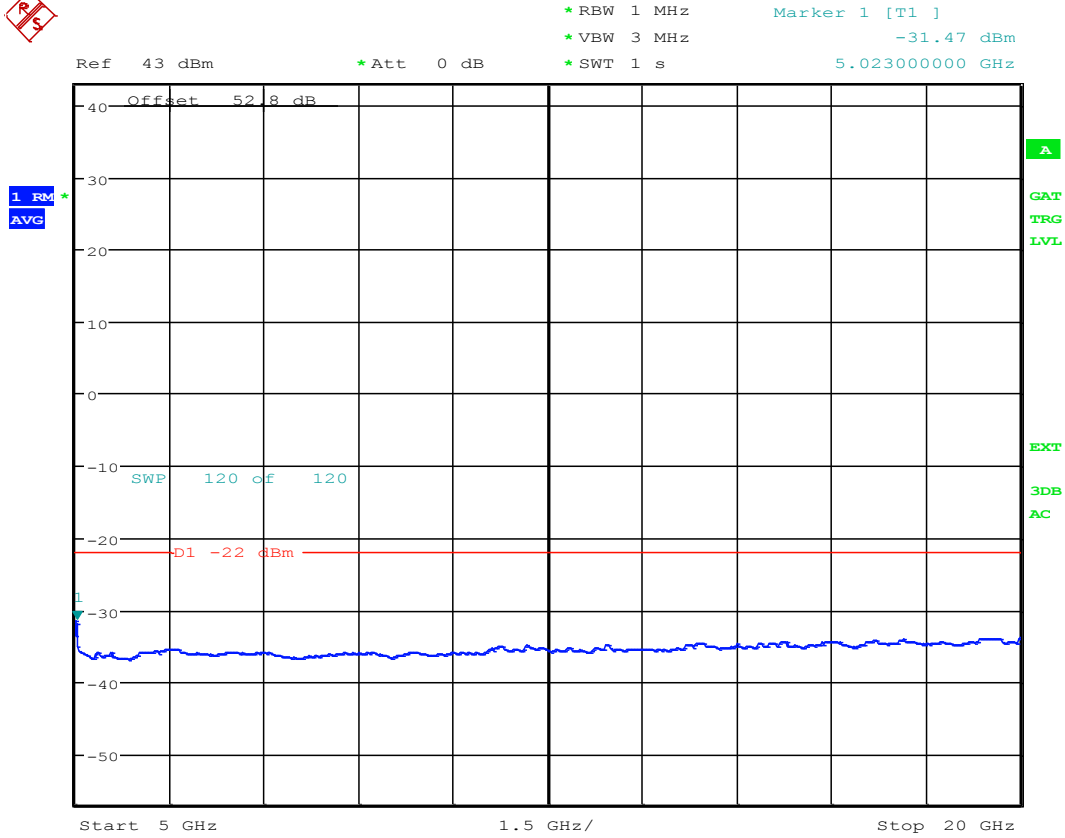
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 26.MAY.2016 10:17:24

FCCID: AS5BBTRX-15



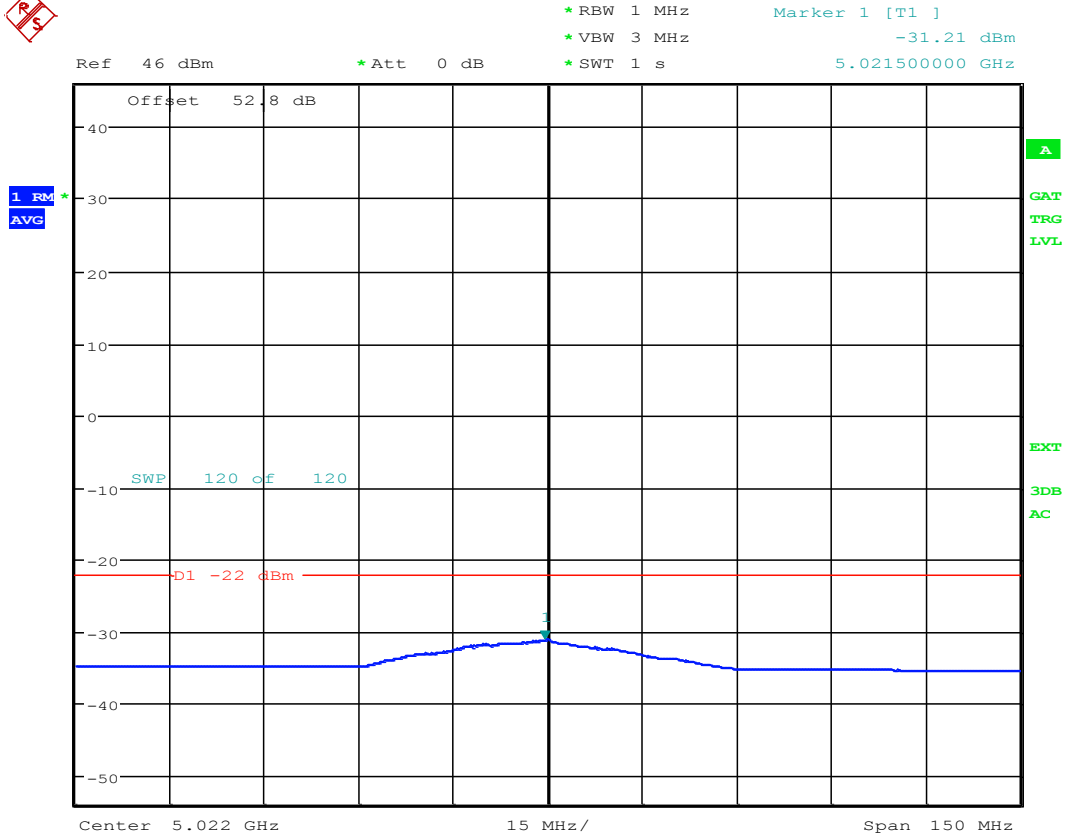
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 26.MAY.2016 09:45:37

FCCID: AS5BBTRX-15



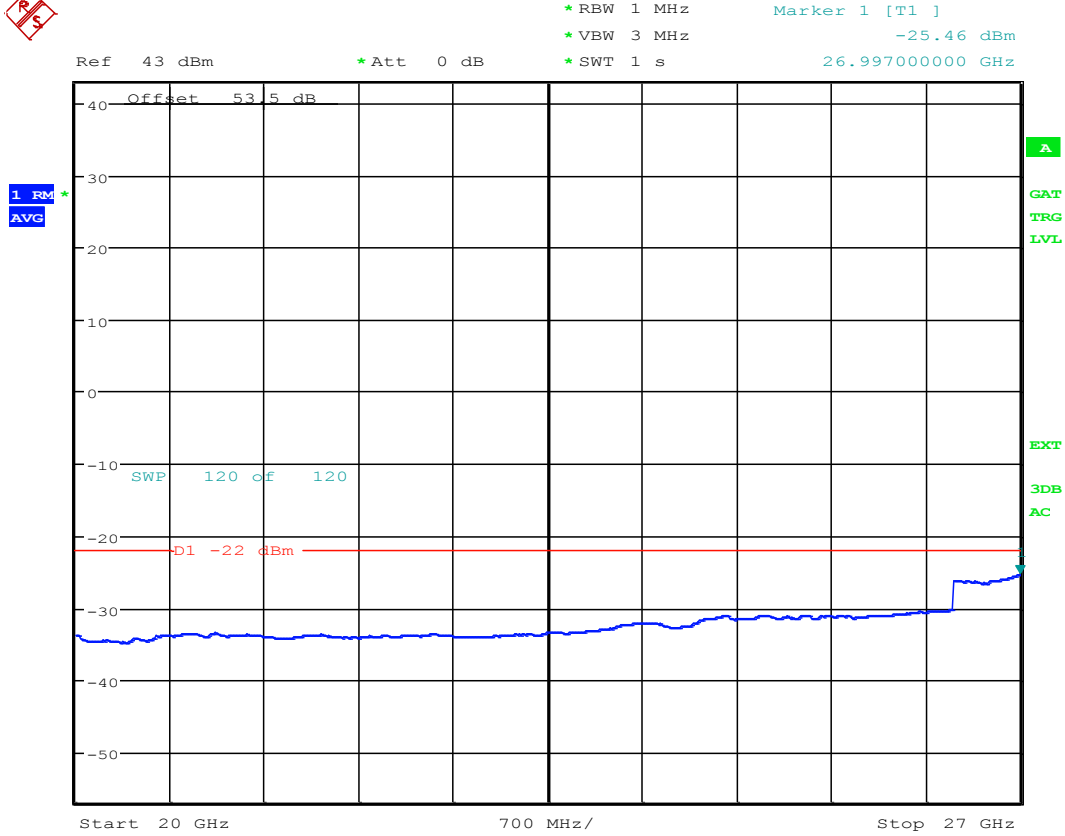
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 26.MAY.2016 09:58:22

FCCID: AS5BBTRX-15



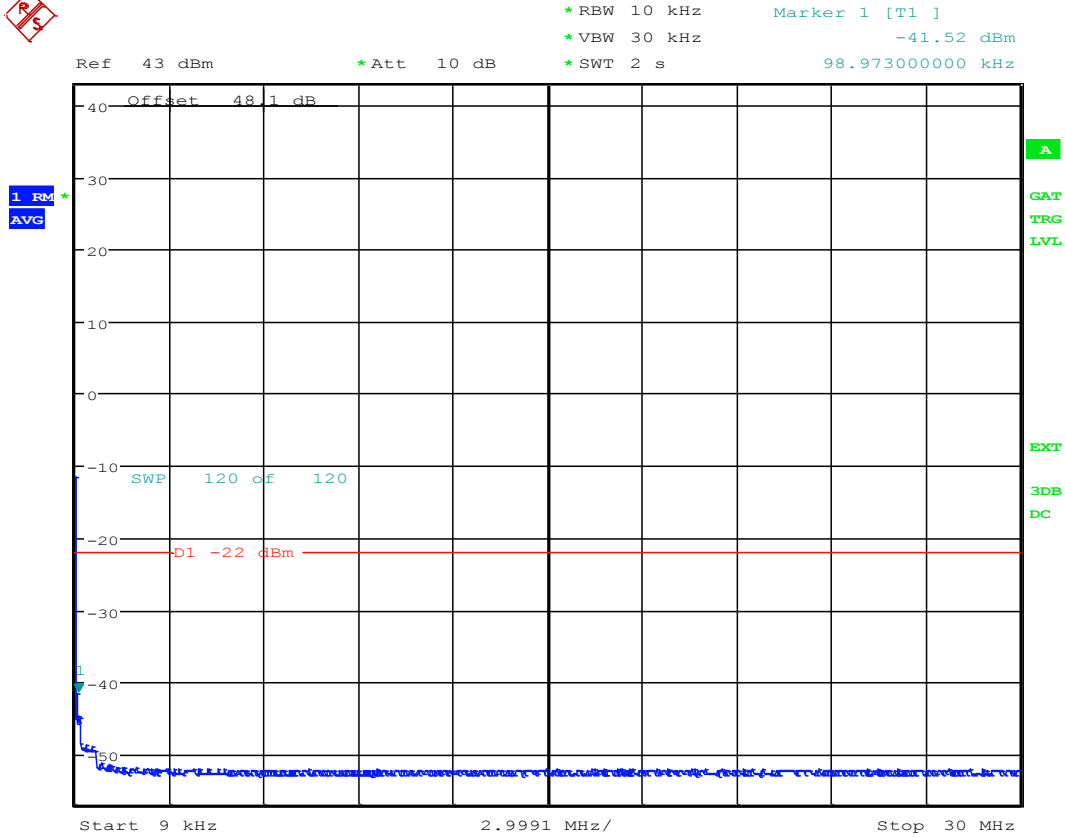
TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 26.MAY.2016 10:31:36

FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;2496-2526M;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;
 CII
 Date: 26.MAY.2016 10:44:45

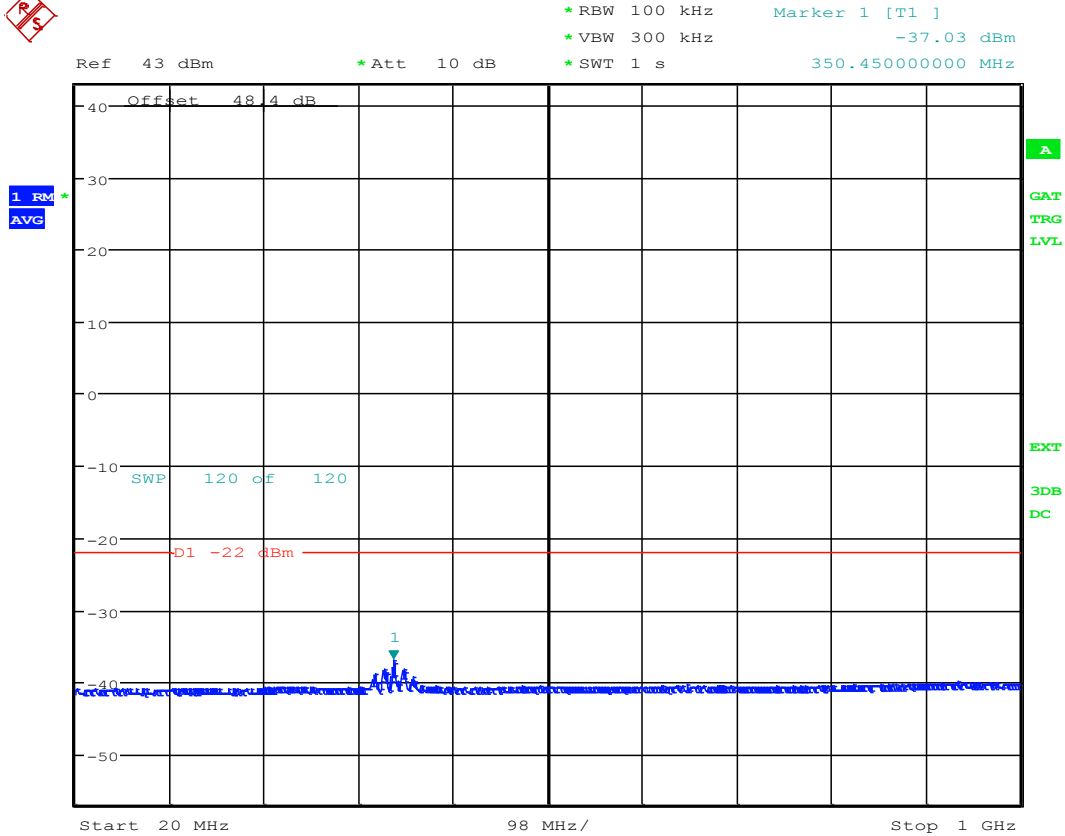
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 26.MAY.2016 14:38:56

2645, 2665 and 2685MHz

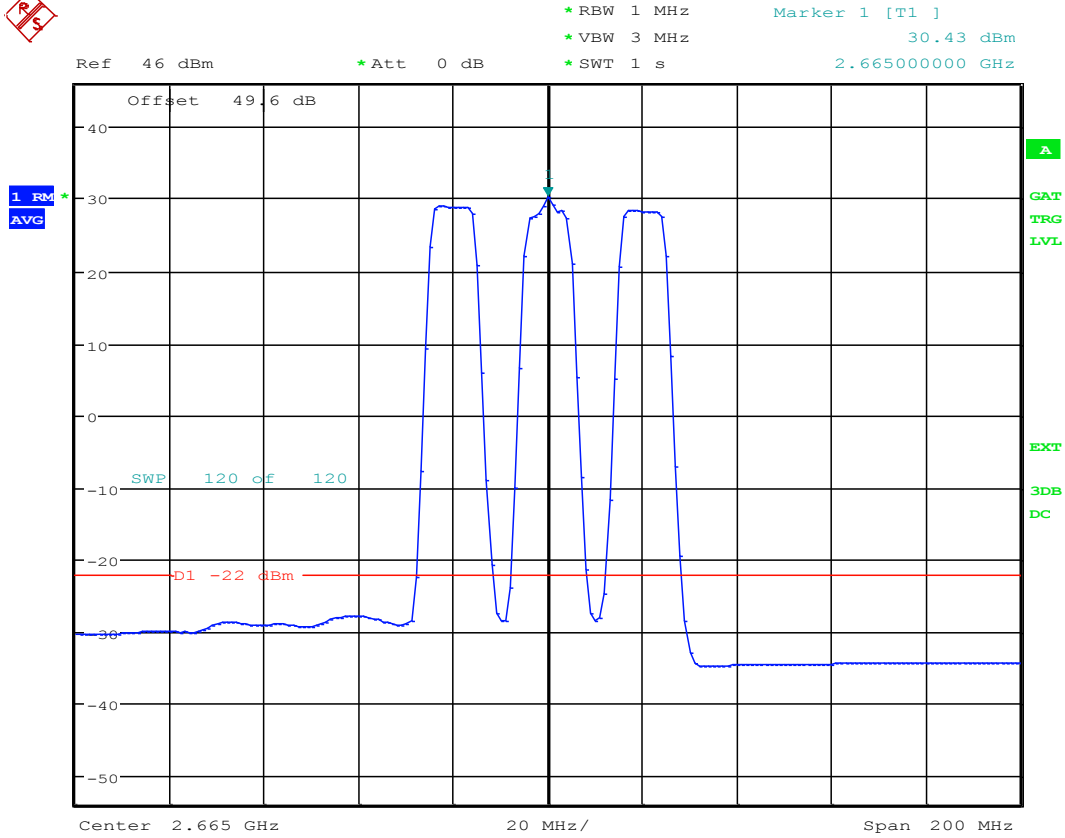
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 13:08:45

2645, 2665 and 2685MHz

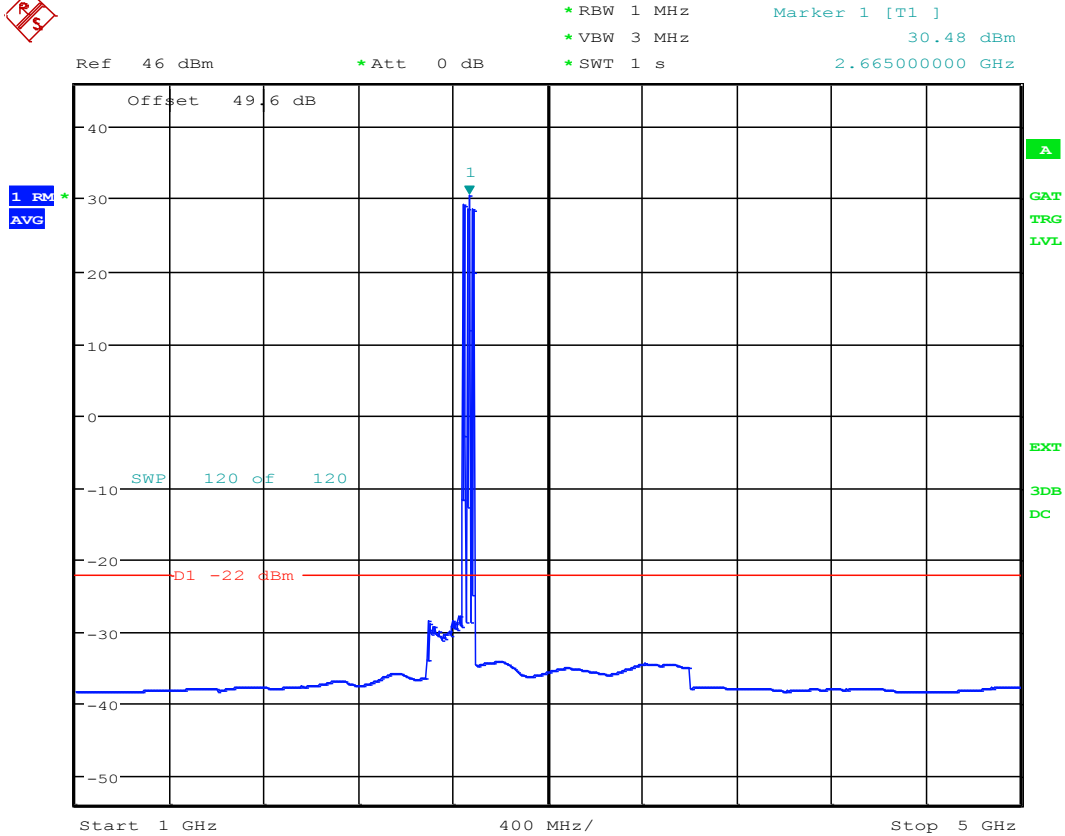
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 14:00:13

2645, 2665 and 2685MHz

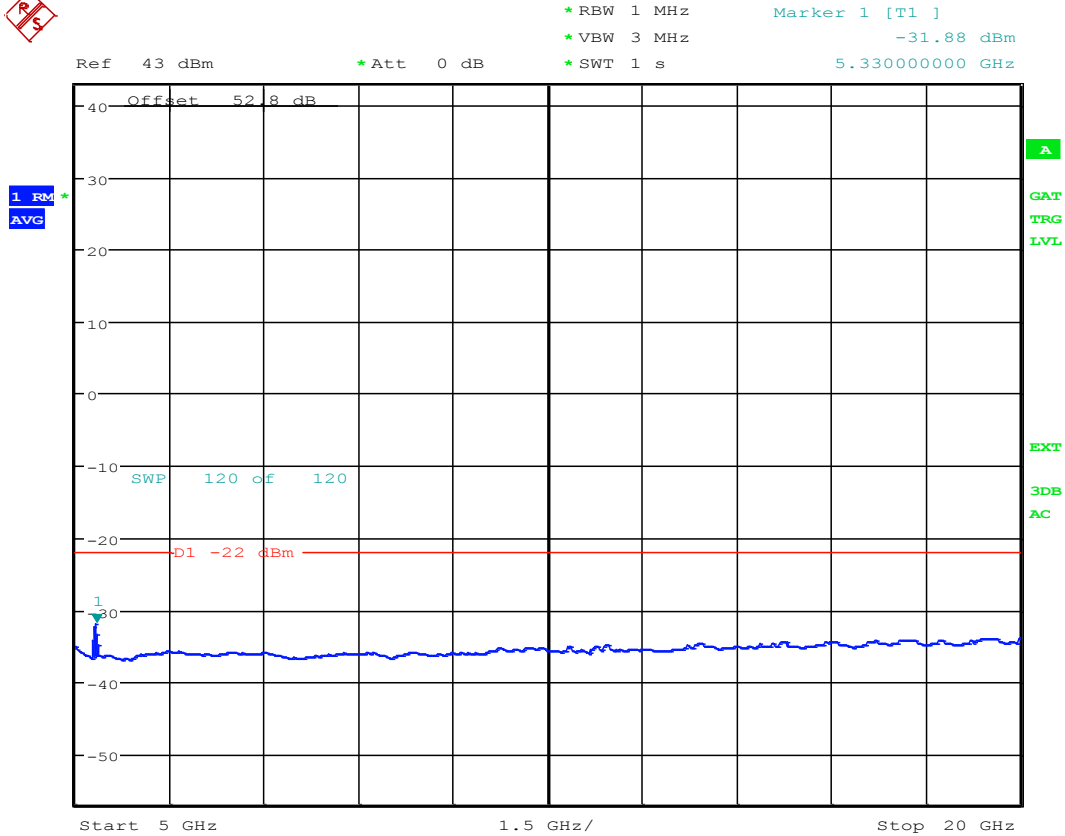
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 13:21:13

2645, 2665 and 2685MHz

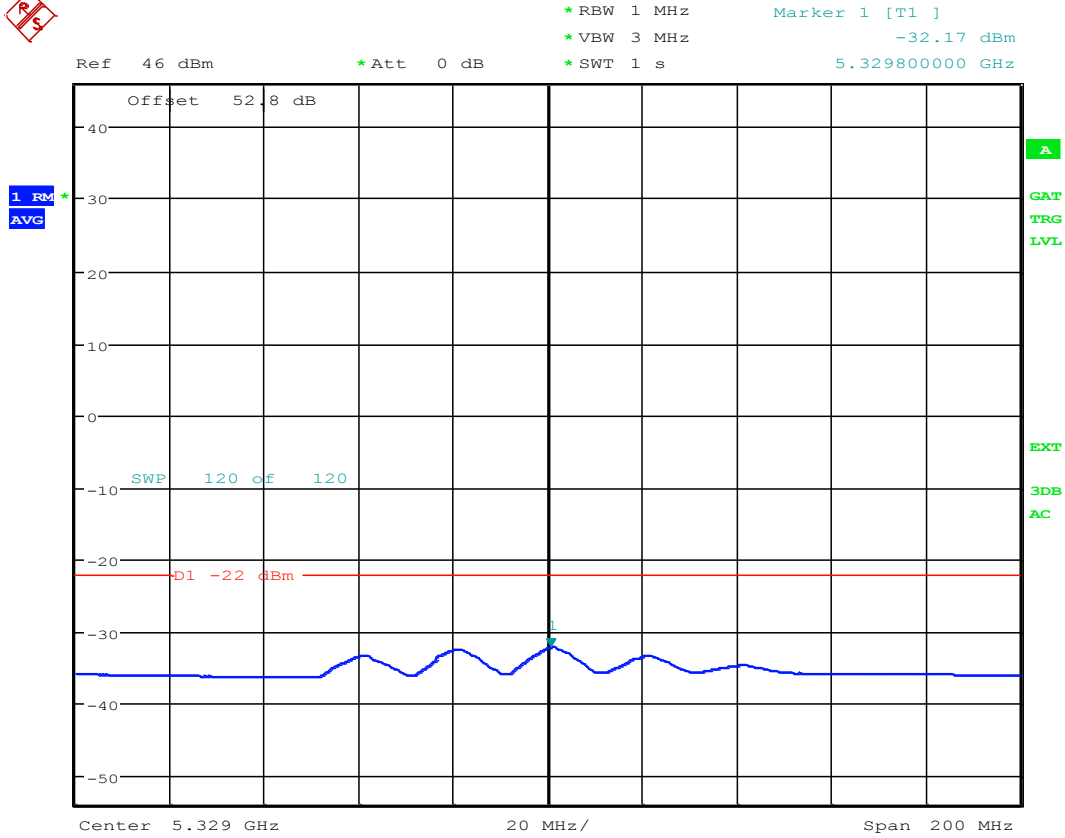
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 13:35:51

2645, 2665 and 2685MHz

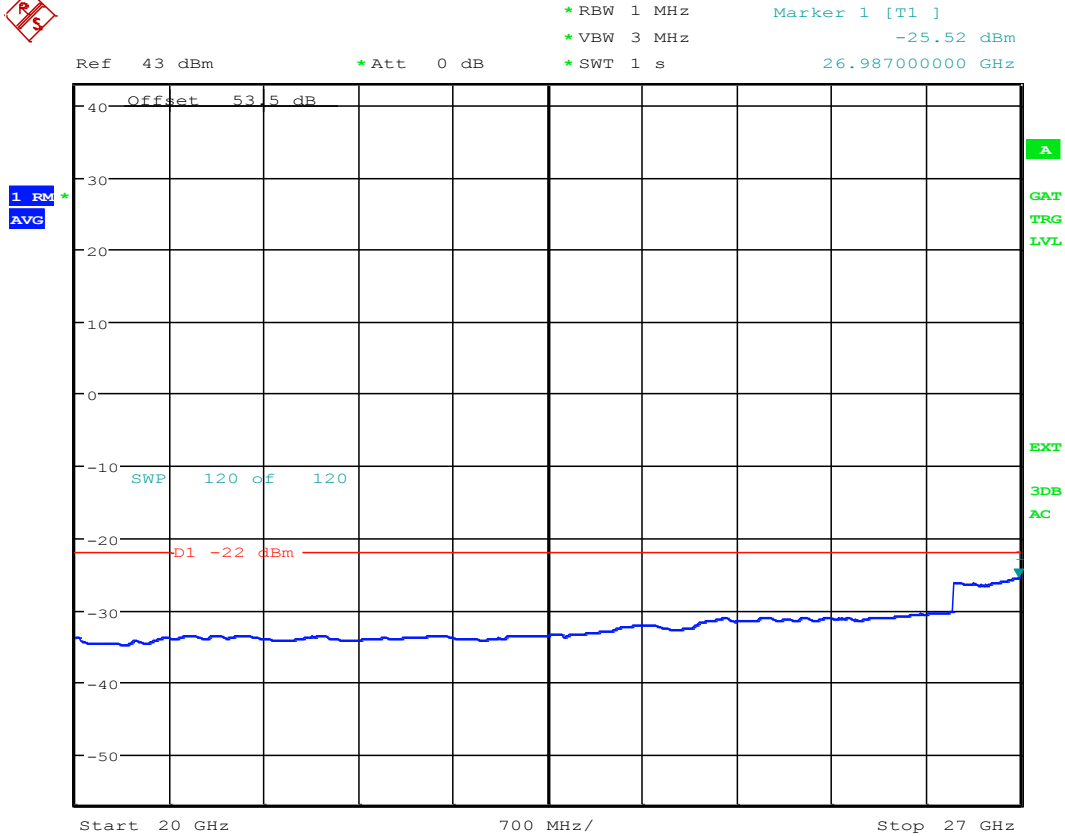
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 14:12:50

2645, 2665 and 2685MHz

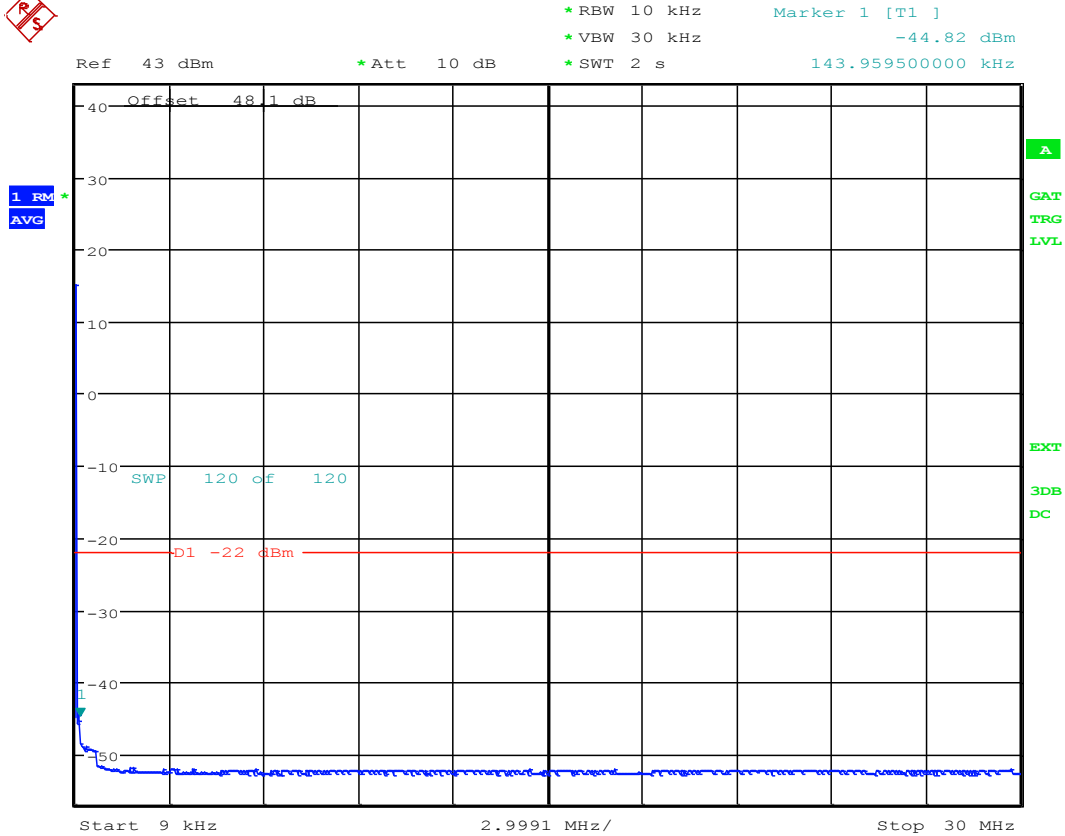
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 13:48:17

2645, 2665 and 2685MHz

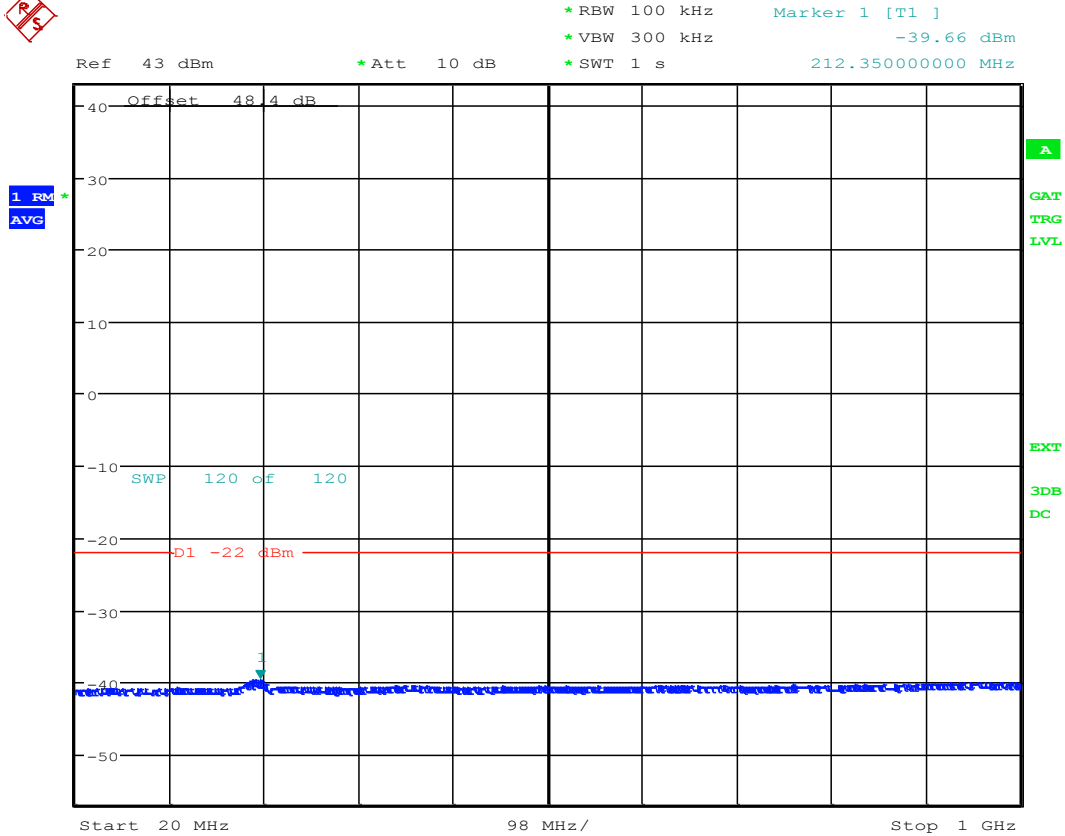
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 31.MAY.2016 09:37:59

2516, 2521 and 2531 MHz

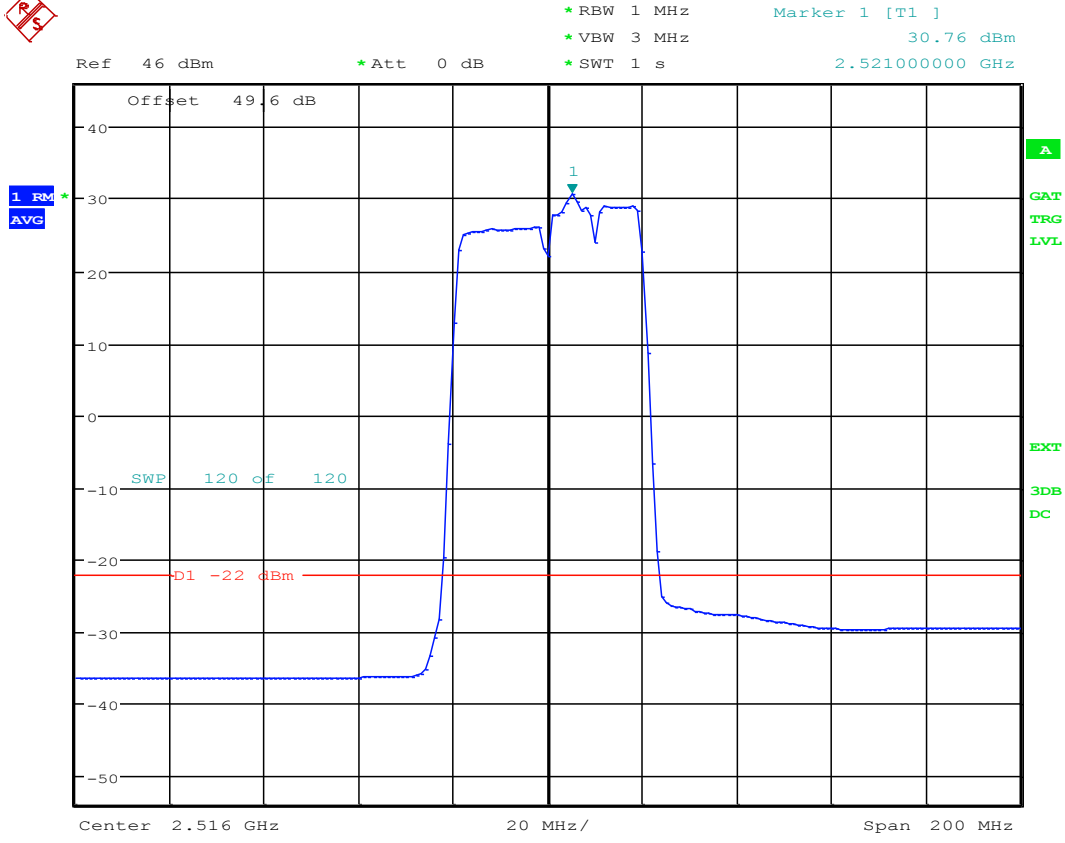
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 15:57:17

2516, 2521 and 2531 MHz

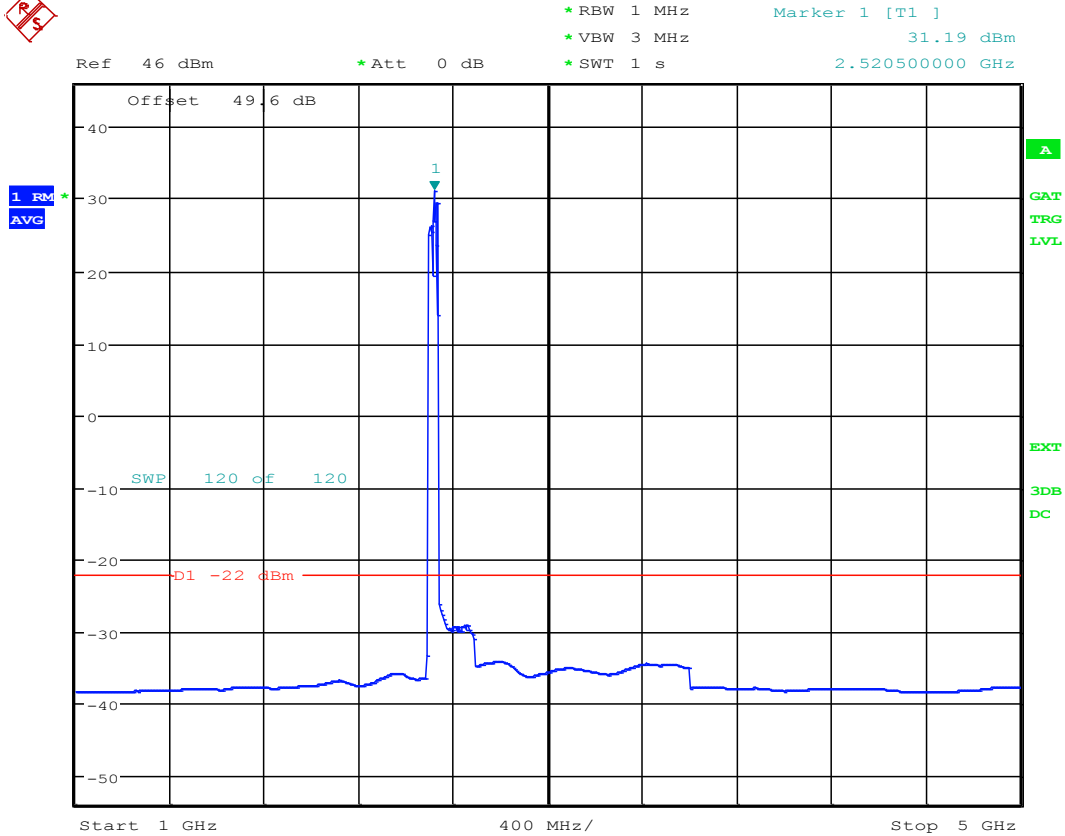
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 17:34:09

2516, 2521 and 2531 MHz

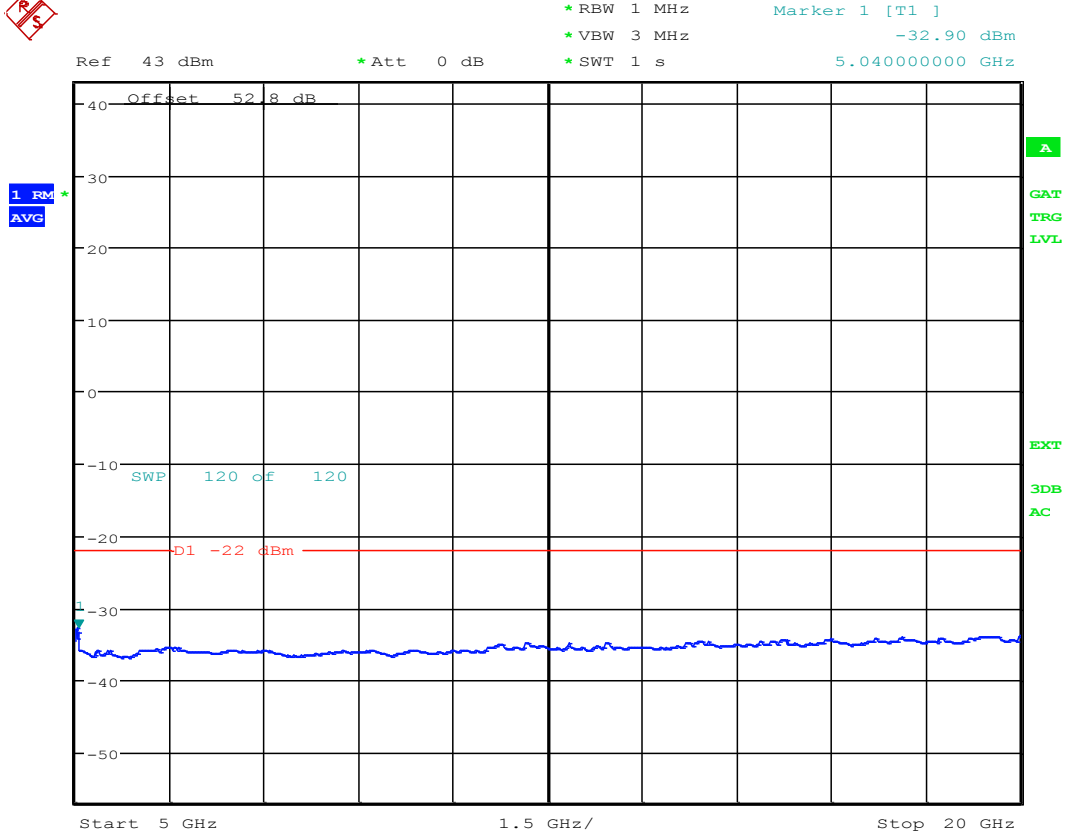
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 ;20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 16:10:21

2516, 2521 and 2531 MHz

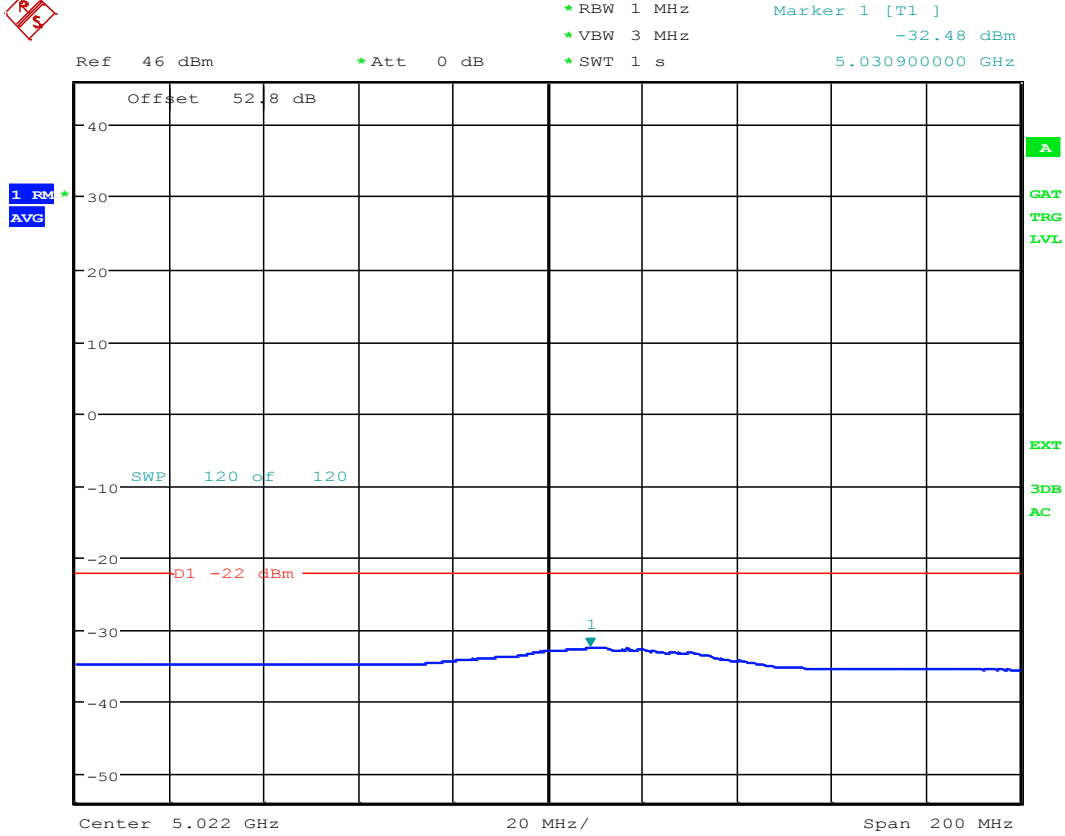
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 17:22:24

2516, 2521 and 2531 MHz

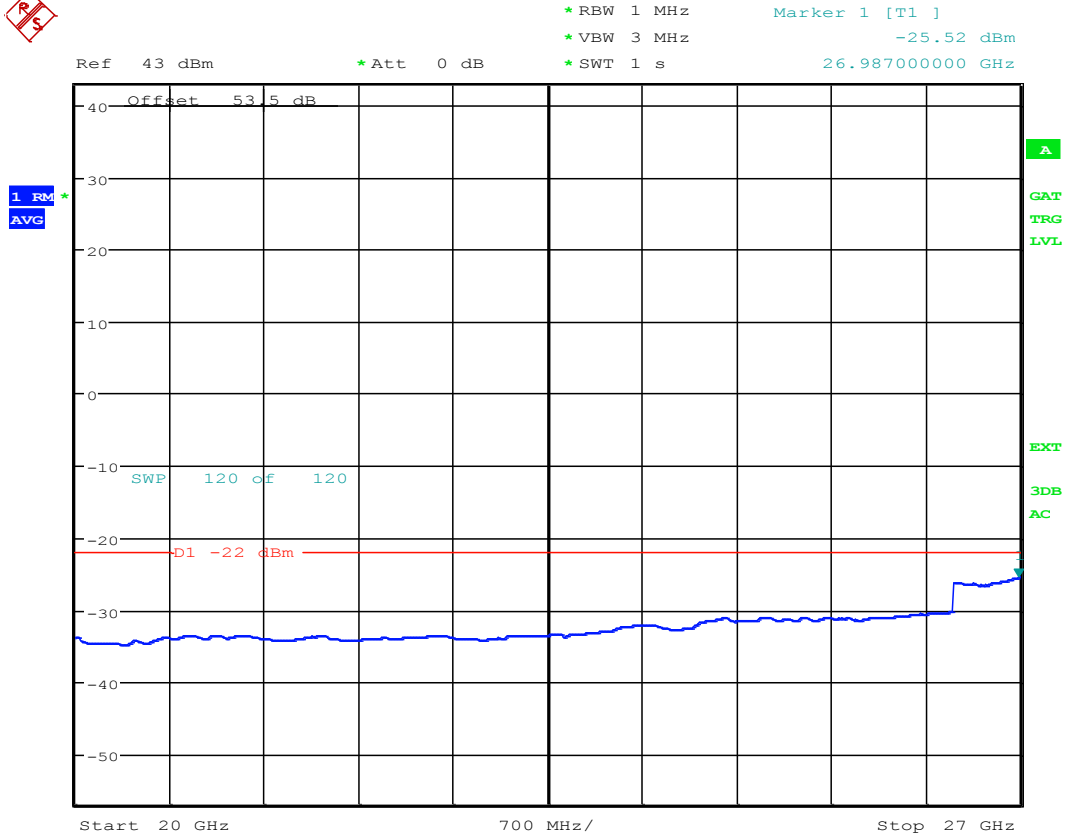
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 17:47:34

2516, 2521 and 2531 MHz

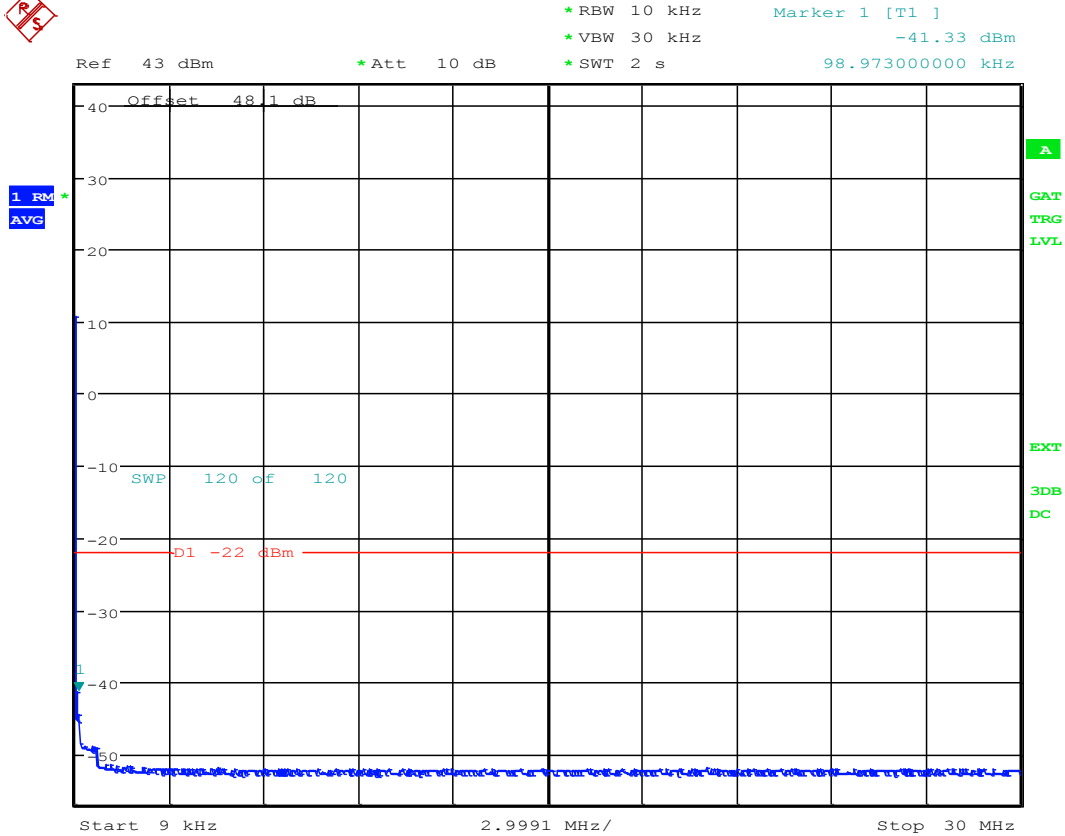
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 10+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 13:48:17

2516, 2521 and 2531 MHz

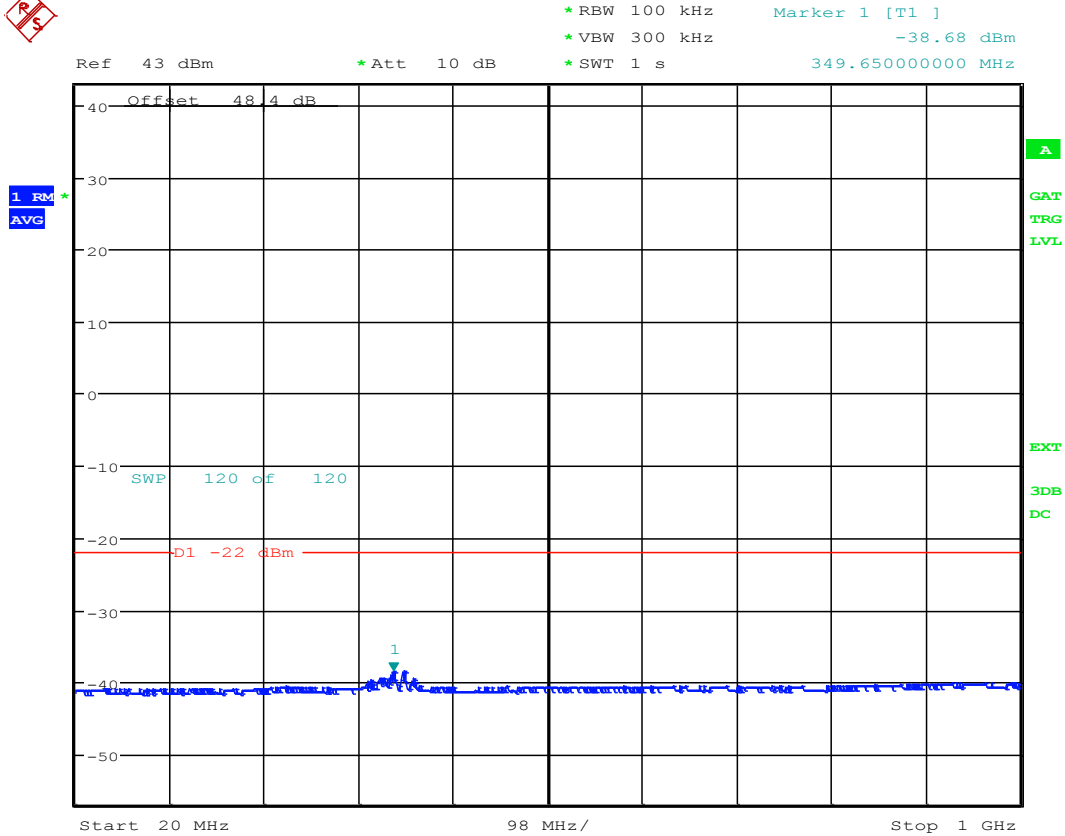
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A; CII
 Date: 27.MAY.2016 10:46:09

2635, 2665 and 2685 MHz

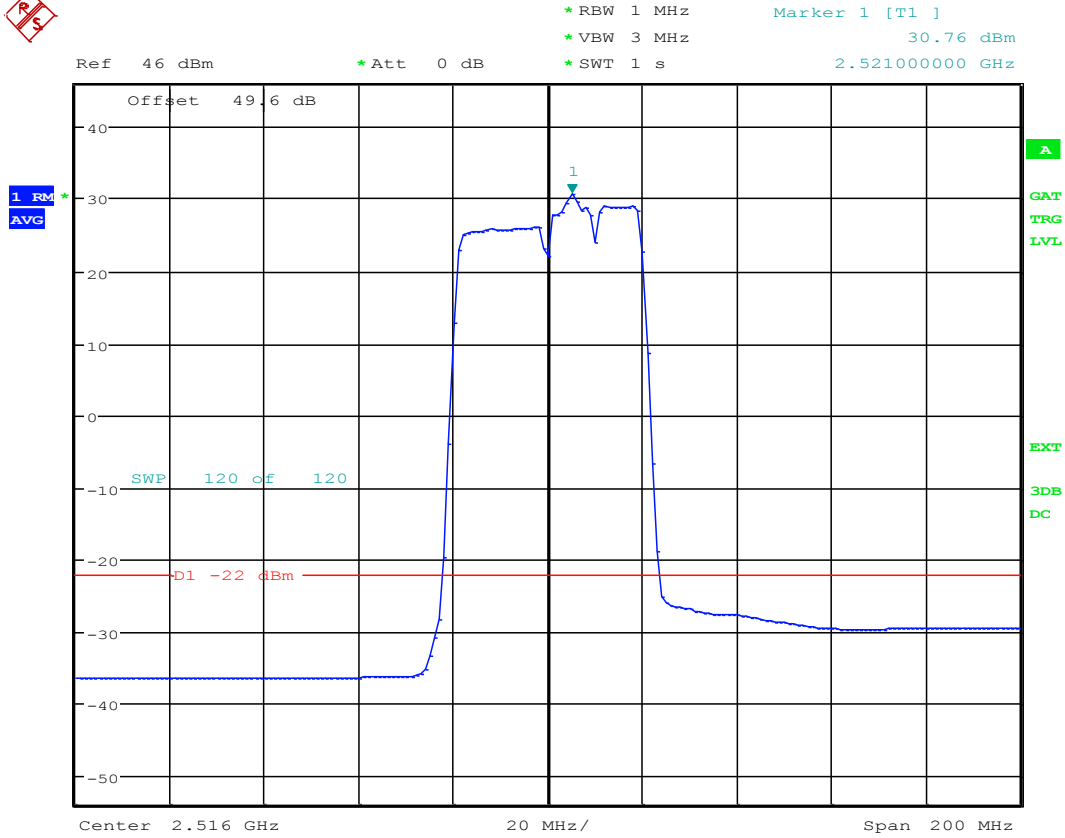
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 27.MAY.2016 11:02:25

2635, 2665 and 2685 MHz

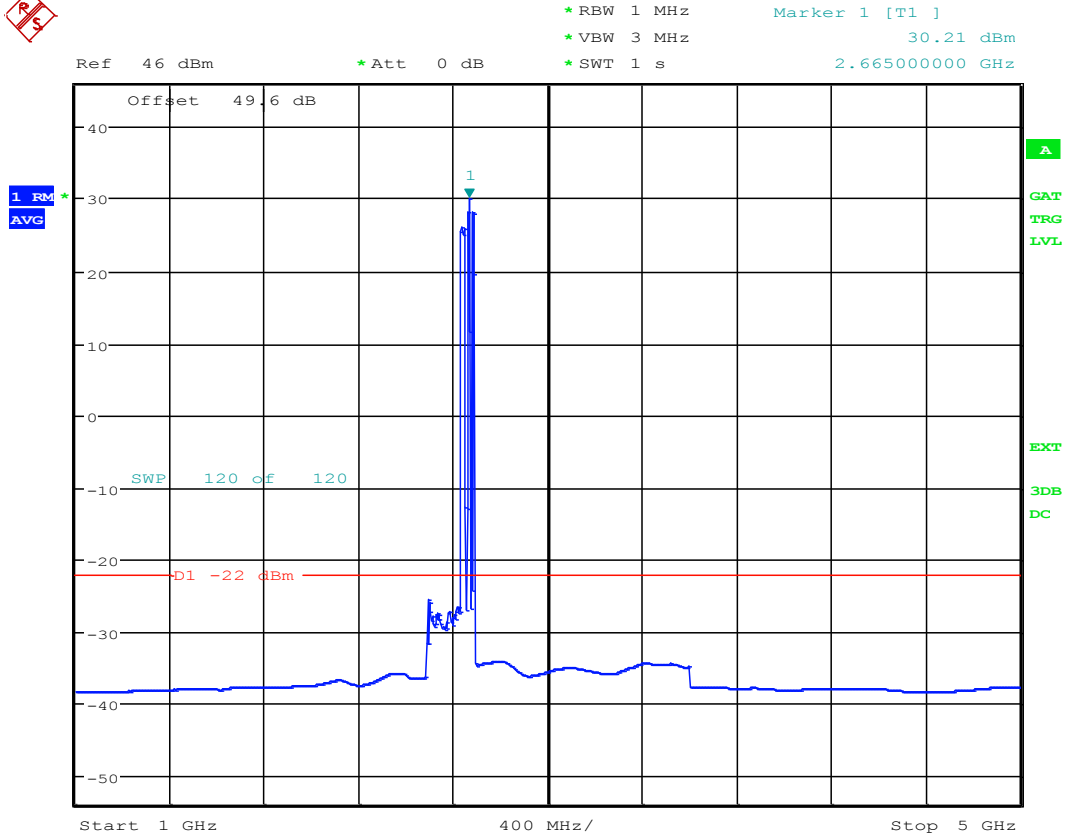
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 26.MAY.2016 17:34:09

2635, 2665 and 2685 MHz

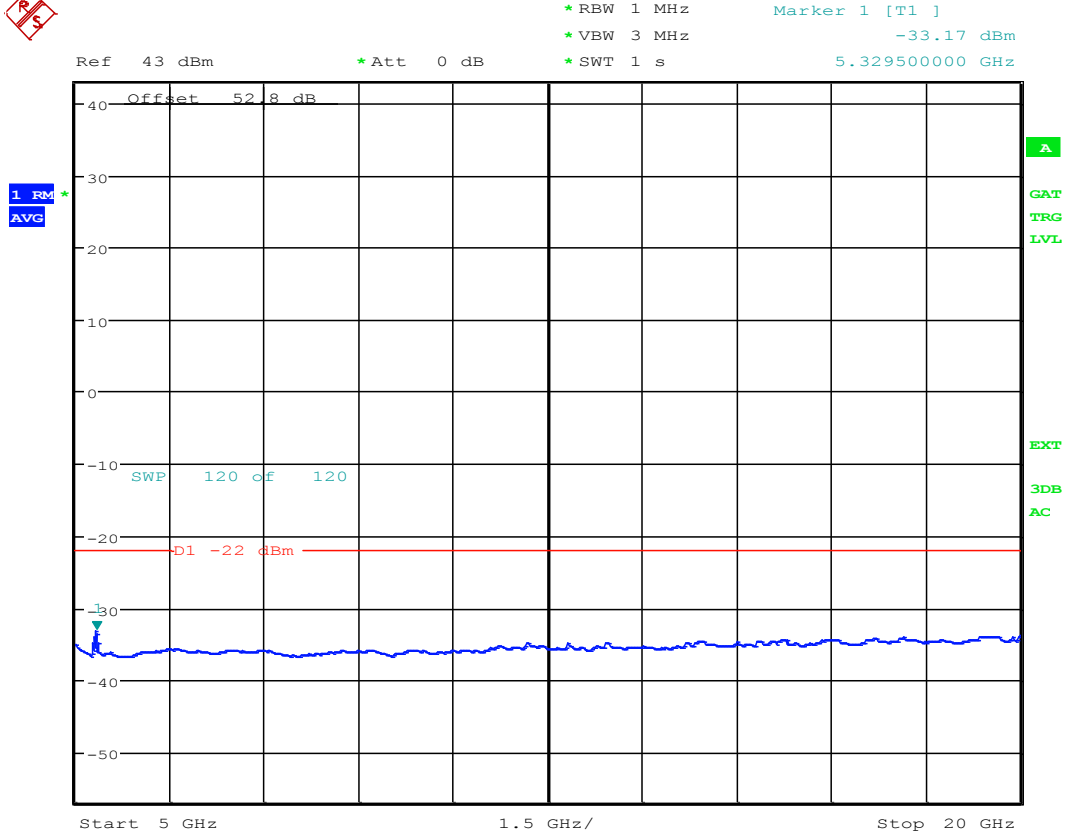
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 27.MAY.2016 11:19:15

2635, 2665 and 2685 MHz

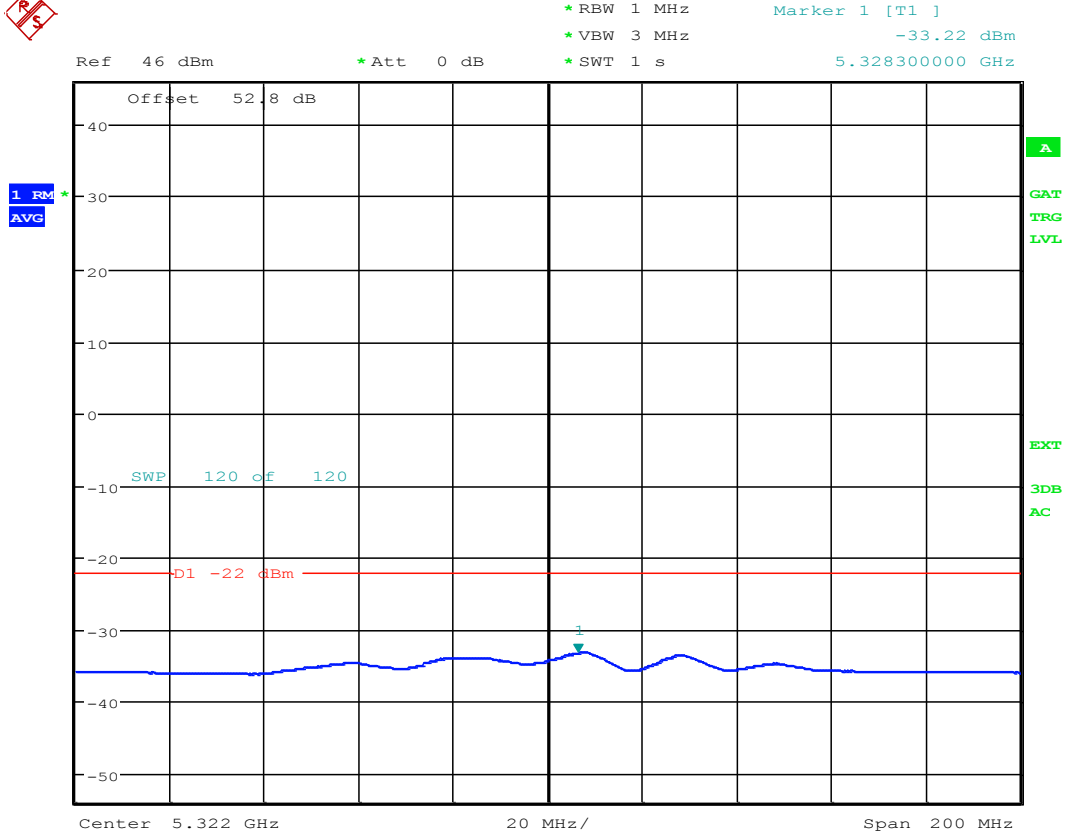
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 27.MAY.2016 11:32:26

2635, 2665 and 2685 MHz

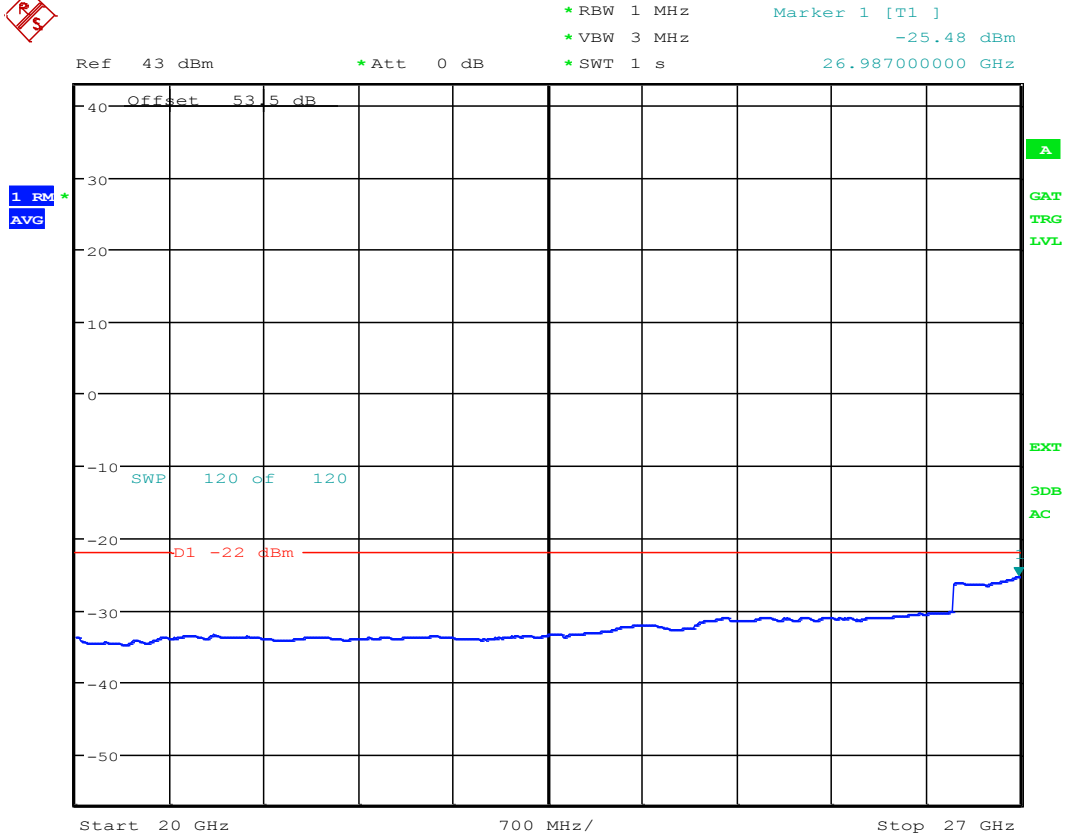
FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 27.MAY.2016 11:58:40

2635, 2665 and 2685 MHz

FCCID: AS5BBTRX-15



TX SPURIOUS: TEST ENG:JY; B41 TDD A RRH 8X20;20W
 20+10+10M BW;QPSK/16QAM/64QAM;FCCID:AS5BBTRX-15A;CII
 Date: 27.MAY.2016 12:12:45

2635, 2665 and 2685 MHz

FCCID: AS5BBTRX-15

4.5 Section 2.1055 MEASUREMENT REQUIRED: FREQUENCY STABILITY

This measurement evaluates the frequency difference between the actual transmit carrier frequency and the specified transmit frequency assignment. Only the portion of the transmitter system containing the frequency determining and stabilizing circuitry need be put in an environmental chamber and subjected to the temperature variation test per FCC Section 2.1055. The unit which provides baseband signals, such as BBU (baseband unit), can be located outside the chamber if it is a separated unit.

The EUT transmits in the 2496-2690 MHz frequency band with LTE technology with 8x8 MIMO.

4.5.1 Frequency Stability Results:

This EUT was previously tested during the original filing process. For this Class II Permissive Change, new data is not required.

4.6 Section 2.1053 MEASUREMENT REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION

This measurement evaluates the spurious emissions that may be radiated directly from the EUT cabinet, circuits or power leads under normal conditions of installation and operation. The EUT was investigated from 30 MHz to the 10th harmonic of the carrier, per Section 2.1057(a)(1).

The EUT transmits in the 2496-2690 MHz frequency band with LTE technology and 8x8 MIMO. It was configured as in the normal mode of the installation and operation with the maximum power output per Table 4.6.1. The test model used for configuring the LTE carrier was described in Section 4.3. All carriers were transmitting to non-radiating 50 Ω resistive loads.

Table 4.6.1 EUT Configurations

Config No	No of Carriers/Port	Tx1 (freq/MHz)	Rx1 (freq/MHz)	Power/ port (dBm)	Carrier BW (MHz)	Modulations
1	3	2506 + 2521 +2531	2506 + 2521 +2531	43	20 + 10 + 10	QPSK/ 16QAM & 64QAM
2	3	2640 + 2665 + 2685	2640 + 2665 + 2685	43	20 + 10 + 10	QPSK/ 16QAM & 64QAM

The emission limits and the setting of measurement equipment for the spurious emissions measurement were given in Section 4.3. FCC sections 2.1051 and 2.1057(c) specify that the spurious emissions attenuated more than 20 dB below the permissible value need not be reported. By using the relation between the electric field strength of an ideal dipole and its excitation power given in Reference Data for Radio Engineers, page 676, 4th edition, ITT Corp., the emission limit calculated for electric field strength and its reportable limit equal:

Table 4.6.2 Calculated Radiated Spurious Emission Limit in Electrical Field Strength

Frequency Range (MHz)	Measurement Distance (m)	Required E Limit (2x2 MIMO) (dBμV/m)	Reportable E Limit (dBμV/m)	Detector/RBW
10-20,000	3	81.1	61.1	Average/1MHz

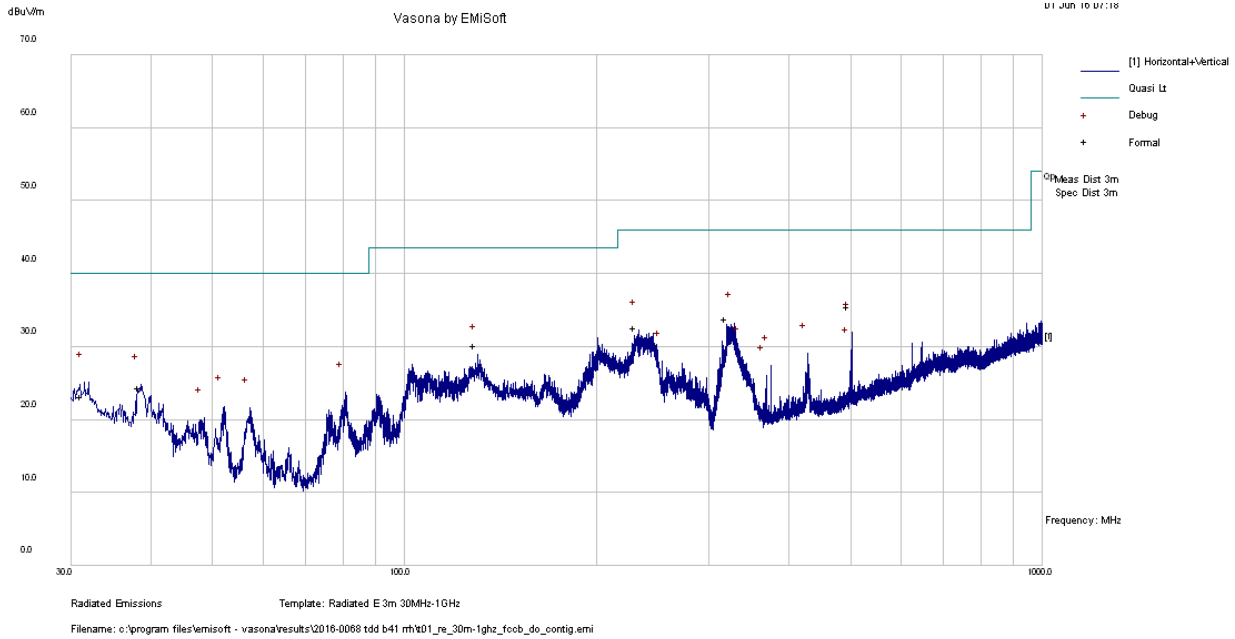
The field strength of radiated spurious emissions measured was determined by

$$E(\text{dB}\mu\text{V}/\text{m}) = V_{\text{meas}}(\text{dB}\mu\text{V}) + \text{Cable Loss}(\text{dB}) + \text{Antenna Factor}(\text{dBi}/\text{m}).$$

Field strength measurements of radiated spurious emissions were made at a semi anechoic room of Global Product Compliance Laboratories of Alcatel-Lucent Murray Hill which was detailed in Section 6. The recommendations of ANSI C63.4 and ANSI C63.26 were followed for EUT testing setup, cabling, and measurement approach and procedures. All the measurement equipment used, including antennas, was calibrated in accordance with ISO 9001 process. The EUT setup diagram is given in the Figure 4.6.1. The minimum margin measured per Table 4.6.2 is more than 20dB.

RADIATED EMISSIONS DATA
(Worst Case)

T01_RE_30MHz-1GHz_FCCpt15_ClassB_DO_Contiguous



Results Title: Radiated E 3m 30MHz-1GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t01_re_30m-1ghz_fccb_do_contig.emi
Test Laboratory: GPCL AR5-MH 23C, 47%RH, 996mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Contiguous @ 2506MHz 20MHz BW w/ 64QAM + 2521MHz 10MHz BW QPSK/16QAM & 2531MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 120kHz RBW & 300kHz VBW; FCC Radiated Emissions (30MHz-1GHz) Class B limits with maintenance port covers off.
Date: 2016-06-01 07:18:45

FORMAL DATA

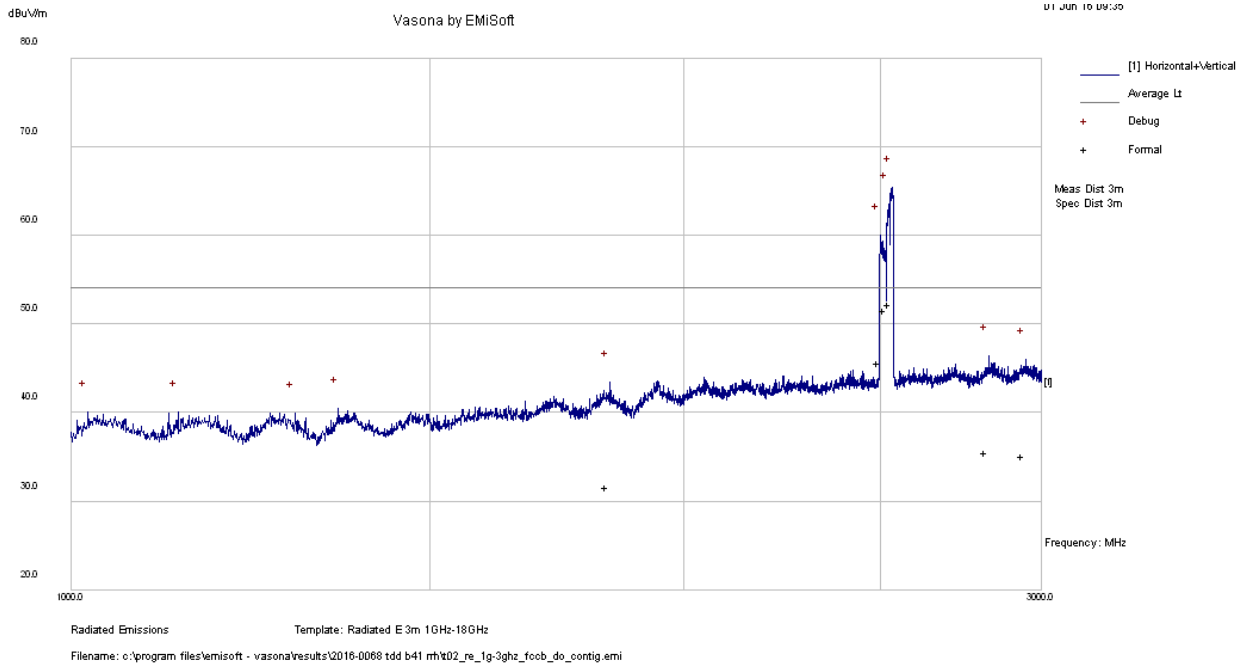
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
502.01	37.58	7.72	-13.9	31.45	QuasiMax	V	100	184	46	-14.55	Pass	
323.387	40.31	7.34	-17.9	29.75	QuasiMax	H	179	233	46	-16.25	Pass	
130.425	33.35	6.79	-14	26.11	QuasiMax	V	100	313	43.5	-17.39	Pass	
232.517	40.25	7.13	-18.8	28.57	QuasiMax	V	304	245	46	-17.43	Pass	
38.856	32	6.49	-18.1	20.41	QuasiMax	V	128	255	40	-19.59	Pass	
31.523	26.44	6.54	-13.9	19.12	QuasiMax	V	154	307	40	-20.88	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
328.196	43.7	7.36	-17.8	33.24	Preview	H	190	225	46	-12.76	Pass	
232.581	43.92	7.13	-18.8	32.25	Preview	V	302	225	46	-13.75	Pass	
502.016	38.07	7.72	-13.9	31.95	Preview	V	102	225	46	-14.05	Pass	
130.329	36.12	6.79	-14	28.89	Preview	V	102	0	43.5	-14.61	Pass	
31.5391	32.47	6.54	-13.9	25.13	Preview	V	102	0	40	-14.87	Pass	
38.5611	36.2	6.5	-17.9	24.77	Preview	V	102	225	40	-15.23	Pass	
80.6934	39.93	6.62	-22.8	23.75	Preview	H	190	0	40	-16.25	Pass	
428.717	36.3	7.59	-14.8	29.06	Preview	H	190	225	46	-16.94	Pass	
337.431	38.82	7.38	-17.6	28.58	Preview	H	190	225	46	-17.42	Pass	
500.092	34.56	7.72	-13.9	28.38	Preview	V	102	315	46	-17.62	Pass	
253.359	37.16	7.18	-16.3	27.99	Preview	V	202	135	46	-18.01	Pass	
52.1242	38.89	6.46	-23.5	21.84	Preview	V	102	315	40	-18.16	Pass	
57.2224	39.86	6.51	-24.8	21.58	Preview	V	102	180	40	-18.42	Pass	
375.042	36.41	7.47	-16.5	27.39	Preview	H	102	225	46	-18.61	Pass	
48.4689	36.08	6.45	-22.3	20.18	Preview	V	102	90	40	-19.82	Pass	
368.597	35.29	7.46	-16.7	26.04	Preview	H	102	225	46	-19.96	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T02_RE_1GHz-3GHz_FCCpt15_ClassB_DO_Contiguous



Results Title: Radiated E 3m 1GHz-18GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t02_re_1g-3ghz_fccb_do_contig.emi
Test Laboratory: GPCL AR5-MH 23C, 53%RH, 1000mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Contiguous @ 2506MHz 20MHz BW w/ 64QAM + 2521MHz 10MHz BW QPSK/16QAM & 2531MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (1GHz-3GHz) Class B limits with maintenance port covers off.
Date: 2016-06-01 10:00:05

FORMAL DATA

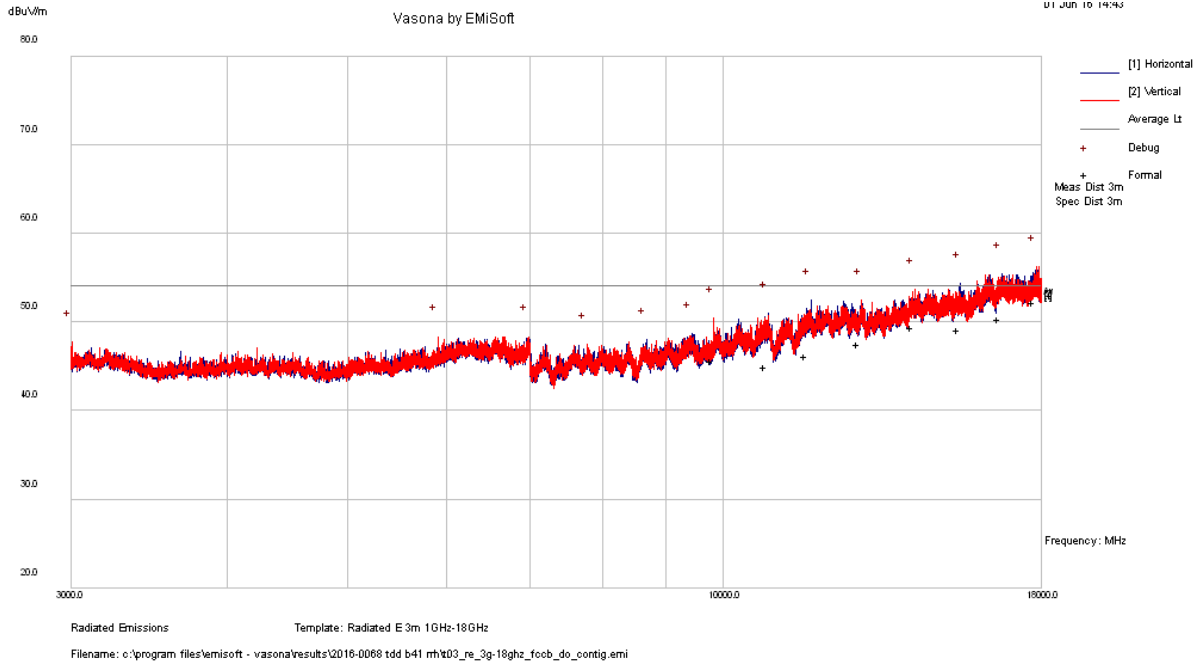
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
2534.41	47.75	2.95	-1.86	48.83	AvgMax	H	153	110	54	-5.17	Pass	Tx - exempt
2520.67	47.06	2.93	-1.88	48.11	AvgMax	H	143	77	54	-5.89	Pass	Tx - exempt
2501.76	41.16	2.9	-1.9	42.16	AvgMax	H	228	127	54	-11.84	Pass	Tx - exempt
2825.8	30.28	3.32	-1.52	32.08	AvgMax	H	105	334	54	-21.92	Pass	
2945.22	29.55	3.46	-1.39	31.62	AvgMax	H	249	343	54	-22.38	Pass	
1840.18	30.56	2.07	-4.4	28.23	AvgMax	H	390	291	54	-25.77	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
2533.55	64.28	2.94	-1.86	65.36	Preview	H	102	110	54	11.36	Fail	Tx - exempt
2521.49	62.43	2.93	-1.88	63.48	Preview	H	102	88	54	9.48	Fail	Tx - exempt
2498.99	59.02	2.9	-1.91	60.01	Preview	H	102	132	54	6.01	Fail	Tx - exempt
2825.53	44.56	3.32	-1.52	46.36	Preview	H	102	44	54	-7.64	Pass	
2945.28	43.88	3.46	-1.39	45.95	Preview	H	390	198	54	-8.05	Pass	
1840.72	45.73	2.07	-4.39	43.41	Preview	H	290	88	54	-10.59	Pass	
1353.65	45.64	1.79	-6.99	40.44	Preview	H	190	154	54	-13.56	Pass	
1019.29	46.45	1.54	-7.96	40.03	Preview	H	102	176	54	-13.97	Pass	
1128.6	45.99	1.63	-7.62	40.01	Preview	H	102	352	54	-13.99	Pass	
1289.35	45.38	1.75	-7.16	39.96	Preview	V	102	132	54	-14.04	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T03_RE_3GHz-18GHz_FCCpt15_ClassB_DO_Contiguous



Results Title: Radiated E 3m 1GHz-18GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t03_re_3g-18ghz_fcob_do_contig.emi
Test Laboratory: GPCL AR5-MH 23C, 53%RH, 1000mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Contiguous @ 2506MHz 20MHz BW w/ 64QAM + 2521MHz 10MHz BW QPSK/16QAM & 2531MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (3GHz-18GHz) Class B limits with maintenance port covers off. HPF on preamp to block Tx signal.
Date: 2016-06-01 15:12:31

FORMAL DATA

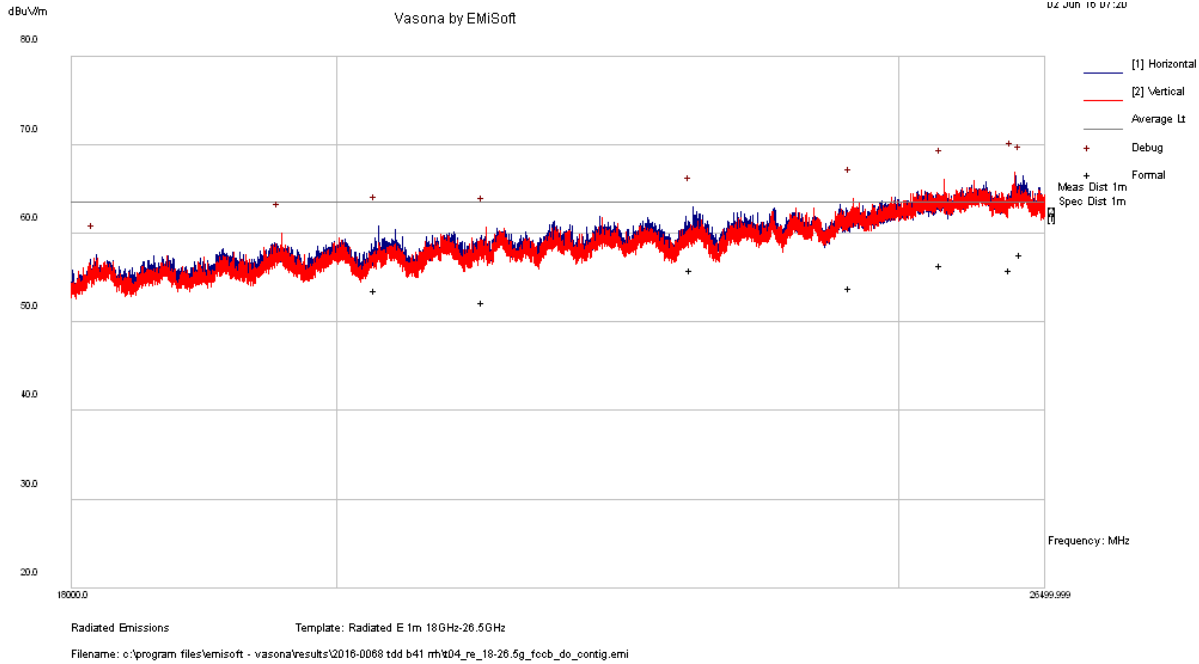
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
17809.9	30	9.49	9.3	48.79	AvgMax	V	137	329	54	-5.21	Pass	
16727.8	28.92	9.05	8.98	46.95	AvgMax	H	100	178	54	-7.05	Pass	
14250.6	30	8.13	7.82	45.95	AvgMax	V	300	265	54	-8.05	Pass	
15503.7	29.24	8.78	7.62	45.65	AvgMax	H	110	108	54	-8.35	Pass	
12906.4	29.85	7.75	6.46	44.06	AvgMax	V	363	284	54	-9.94	Pass	
11718.6	29.7	7.71	5.26	42.67	AvgMax	H	317	124	54	-11.33	Pass	
9830.4	32.28	7.54	2.43	42.25	AvgMax	V	103	331	54	-11.75	Pass	
10865.9	29.7	7.46	4.29	41.45	AvgMax	H	265	73	54	-12.55	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
17817.6	37.44	9.49	9.3	56.23	Preview	V	202	176	54	2.23	Fail	
16726.1	37.42	9.05	8.98	55.45	Preview	H	102	198	54	1.45	Fail	
15502	37.93	8.78	7.62	54.34	Preview	H	102	198	54	0.34	Fail	
14254.6	37.65	8.14	7.82	53.61	Preview	V	390	0	54	-0.39	Pass	
11752.5	39.4	7.72	5.3	52.43	Preview	H	390	0	54	-1.57	Pass	
12913.1	38.18	7.75	6.46	52.39	Preview	V	390	22	54	-1.61	Pass	
10862.8	39.18	7.47	4.28	50.93	Preview	H	390	352	54	-3.07	Pass	
9830.77	40.45	7.54	2.43	50.43	Preview	V	102	0	54	-3.57	Pass	
9442.56	39.25	7.32	2.11	48.68	Preview	H	290	88	54	-5.32	Pass	
5907.68	41.22	5.59	1.53	48.34	Preview	V	302	352	54	-5.66	Pass	
6978.27	41.09	5.32	1.92	48.33	Preview	V	102	132	54	-5.67	Pass	
8680.61	39.55	6.77	1.72	48.04	Preview	H	190	242	54	-5.96	Pass	
3005.24	42.74	6.3	-1.32	47.72	Preview	V	302	88	54	-6.28	Pass	
7778.81	39.73	5.96	1.81	47.5	Preview	V	302	308	54	-6.5	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T04_RE_18GHz-26.5GHz_FCCpt15_ClassB_DO_Contiguous



Results Title: Radiated E 1m 18GHz-26.5GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t04_re_18-26.5g_fccb_do_contig.emi
Test Laboratory: GPCL AR5-MH 23C, 53%RH, 1000mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Contiguous @ 2506MHz 20MHz BW w/ 64QAM + 2521MHz 10MHz BW QPSK/16QAM & 2531MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (18GHz-26.5GHz) Class B @ 1 meter with maintenance port covers off.
Date: 2016-06-02 07:57:09

FORMAL DATA

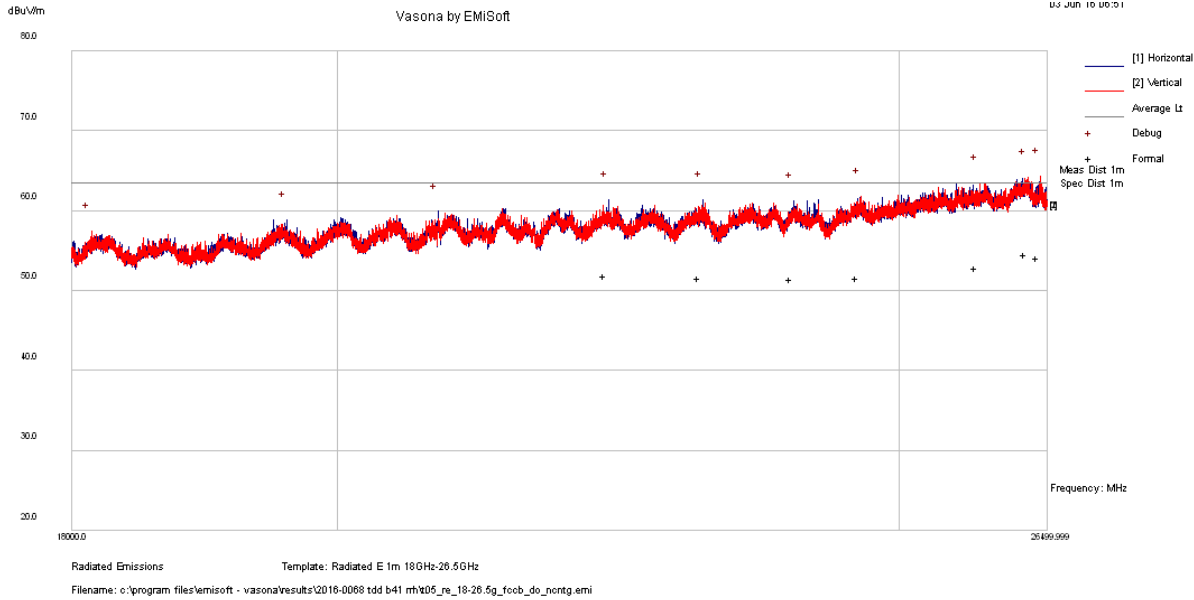
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26275.1	31.08	5.95	17.15	54.19	AvgMax	H	171	138	63.5	-9.31	Pass	
25457.7	30.69	5.43	16.81	52.93	AvgMax	V	137	318	63.5	-10.57	Pass	
26172.6	29.4	5.82	17.27	52.49	AvgMax	V	191	198	63.5	-11.01	Pass	
23051.2	32.69	5.35	14.38	52.42	AvgMax	H	184	310	63.5	-11.08	Pass	
24552.7	29.4	5.25	15.76	50.41	AvgMax	V	194	57	63.5	-13.09	Pass	
20332	31.94	4.87	13.36	50.17	AvgMax	H	115	28	63.5	-13.33	Pass	
21223.7	30	5.02	13.81	48.82	AvgMax	V	199	67	63.5	-14.68	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26176.5	43.76	5.83	17.26	66.85	Preview	V	200	264	63.5	3.35	Fail	
26267.3	43.34	5.94	17.16	66.44	Preview	H	150	132	63.5	2.94	Fail	
25462.8	43.77	5.43	16.82	66.02	Preview	V	200	220	63.5	2.52	Fail	
24553.8	42.89	5.25	15.76	63.9	Preview	V	200	264	63.5	0.4	Fail	
23044.3	43.21	5.35	14.37	62.93	Preview	H	102	110	63.5	-0.57	Pass	
20338.1	42.62	4.88	13.35	60.85	Preview	H	150	286	63.5	-2.65	Pass	
21221.4	41.84	5.02	13.81	60.67	Preview	V	200	132	63.5	-2.83	Pass	
19564.9	41.9	4.7	13.35	59.95	Preview	V	200	330	63.5	-3.55	Pass	
18181.6	41.05	4.37	12.11	57.53	Preview	H	150	22	63.5	-5.97	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T05_RE_18GHz-26.5GHz_FCCpt15_ClassB_DO_Non-Contiguous



Results Title: Radiated E 1m 18GHz-26.5GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t05_re_18-26.5g_fccb_do_ncntg.emi
Test Laboratory: GPCL AR5-MH 23C, 48%RH, 1002mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Non-Contiguous @ 2640MHz 20MHz BW w/ 64QAM + 2665MHz 10MHz BW QPSK/16QAM & 2685MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (18GHz-26.5GHz) Class B @ 1 meter with maintenance port covers off.
Date: 2016-06-03 07:49:36

FORMAL DATA

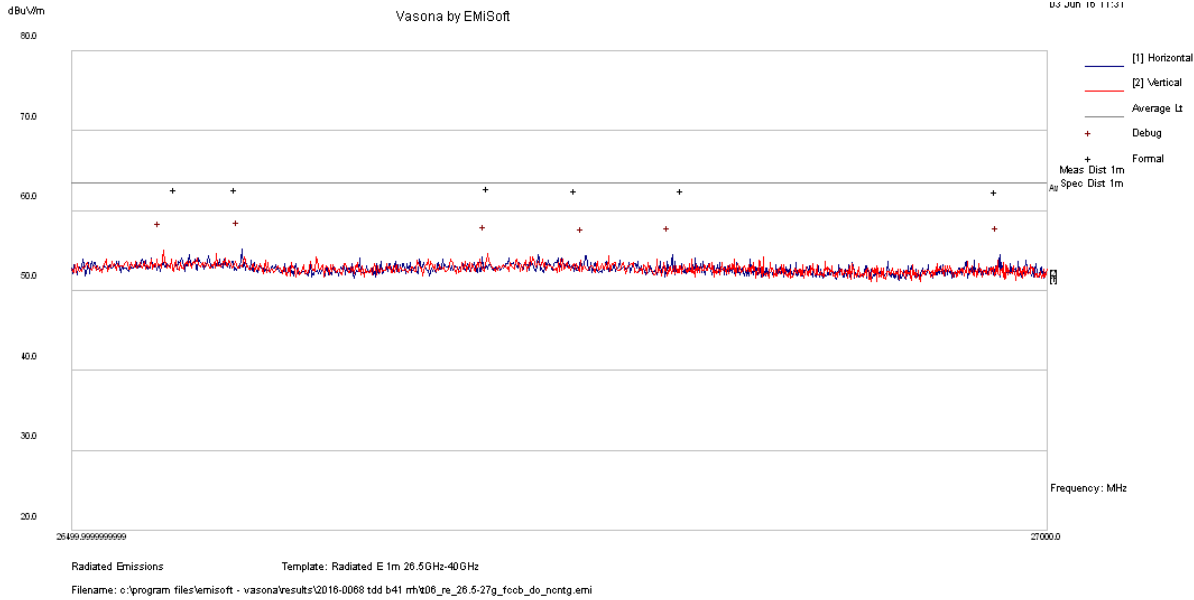
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26305	34.61	5.99	10.5	51.09	AvgMax	V	138	178	63.5	-12.41	Pass	
26437.2	33.71	6.15	10.89	50.76	AvgMax	V	136	53	63.5	-12.74	Pass	
25798.3	34.56	5.5	9.38	49.44	AvgMax	V	175	142	63.5	-14.06	Pass	
22273	35.34	5.1	7.96	48.41	AvgMax	H	204	20	63.5	-15.09	Pass	
23121.8	35.09	5.33	7.81	48.23	AvgMax	H	156	297	63.5	-15.27	Pass	
24618.2	34.86	5.27	8.07	48.2	AvgMax	V	101	262	63.5	-15.3	Pass	
23975.6	35.26	5.17	7.61	48.05	AvgMax	H	176	247	63.5	-15.45	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26434.3	47.25	6.15	10.88	64.28	Preview	V	200	88	63.5	0.78	Fail	
26301.9	47.61	5.98	10.49	64.09	Preview	V	102	352	63.5	0.59	Fail	
25803.6	48.56	5.5	9.39	63.45	Preview	V	152	242	63.5	-0.05	Pass	
24624.5	48.35	5.27	8.08	61.7	Preview	V	102	110	63.5	-1.8	Pass	
23127.1	48.15	5.33	7.81	61.29	Preview	H	150	308	63.5	-2.21	Pass	
22275.1	48.21	5.1	7.96	61.28	Preview	H	102	66	63.5	-2.22	Pass	
23975.9	48.44	5.17	7.61	61.23	Preview	H	102	220	63.5	-2.27	Pass	
20820.3	46.74	4.98	8.14	59.87	Preview	H	200	66	63.5	-3.63	Pass	
19609.1	46.45	4.71	7.66	58.81	Preview	H	102	0	63.5	-4.69	Pass	
18143.1	45.83	4.36	7.17	57.36	Preview	V	102	308	63.5	-6.14	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T06_RE_26.5GHz-27GHz_FCCpt15_ClassB_DO_Non-Contiguous



Results Title: Radiated E 1m 18GHz-26.5GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t06_re_26.5-27g_fccb_do_ncntg.emi
Test Laboratory: GPCL AR5-MH 23C, 52%RH, 1000mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Non-Contiguous @ 2640MHz 20MHz BW w/ 64QAM + 2665MHz 10MHz BW QPSK/16QAM & 2685MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with Preview: 100kHz RBW & 300kHz VBW and Formal: 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (26.5GHz-27GHz) Class B @ 1 meter with maintenance port covers off.
Date: 2016-06-03 11:33:39

FORMAL DATA

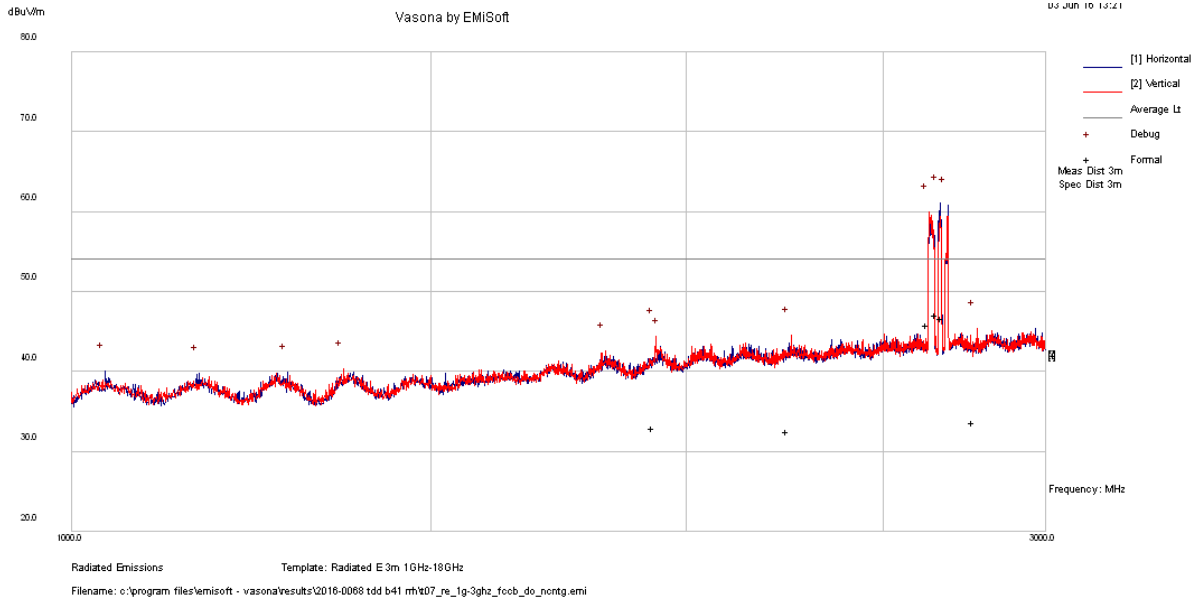
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26714.03	40.19	0	19.22	59.41	AvgMax	V	159	156	63.5	-4.09	Pass	
26554.542	40.32	0	18.97	59.29	AvgMax	V	189	150	63.5	-4.21	Pass	
26585.483	40.19	0	19.02	59.21	AvgMax	H	153	240	63.5	-4.29	Pass	
26813.81	39.78	0	19.38	59.16	AvgMax	H	176	204	63.5	-4.34	Pass	
26759.051	39.78	0	19.29	59.07	AvgMax	H	149	107	63.5	-4.43	Pass	
26975.307	39.3	0	19.63	58.93	AvgMax	H	130	359	63.5	-4.57	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26586.585	36.18	0	19.02	55.2	Preview	H	120	352	63.5	-8.3	Pass	
26546.626	36.11	0	18.95	55.06	Preview	V	100	352	63.5	-8.44	Pass	
26712.527	35.41	0	19.22	54.63	Preview	V	122	176	63.5	-8.87	Pass	
26806.896	35.08	0	19.37	54.45	Preview	H	100	352	63.5	-9.05	Pass	
26976.209	34.77	0	19.63	54.4	Preview	H	102	220	63.5	-9.1	Pass	
26762.759	35.05	0	19.3	54.35	Preview	H	100	352	63.5	-9.15	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T07_RE_1GHz-3GHz_FCCpt15_ClassB_DO_Non-Contiguous



Results Title: Radiated E 3m 1GHz-18GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t07_re_1g-3ghz_fccb_do_ncntg.emi
Test Laboratory: GPCL AR5-MH 23C, 52%RH, 1000mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Non-Contiguous @ 2640MHz 20MHz BW w/ 64QAM + 2665MHz 10MHz BW QPSK/16QAM & 2685MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (1GHz-3GHz) Class B limits with maintenance port covers off.
Date: 2016-06-03 13:45:31

FORMAL DATA

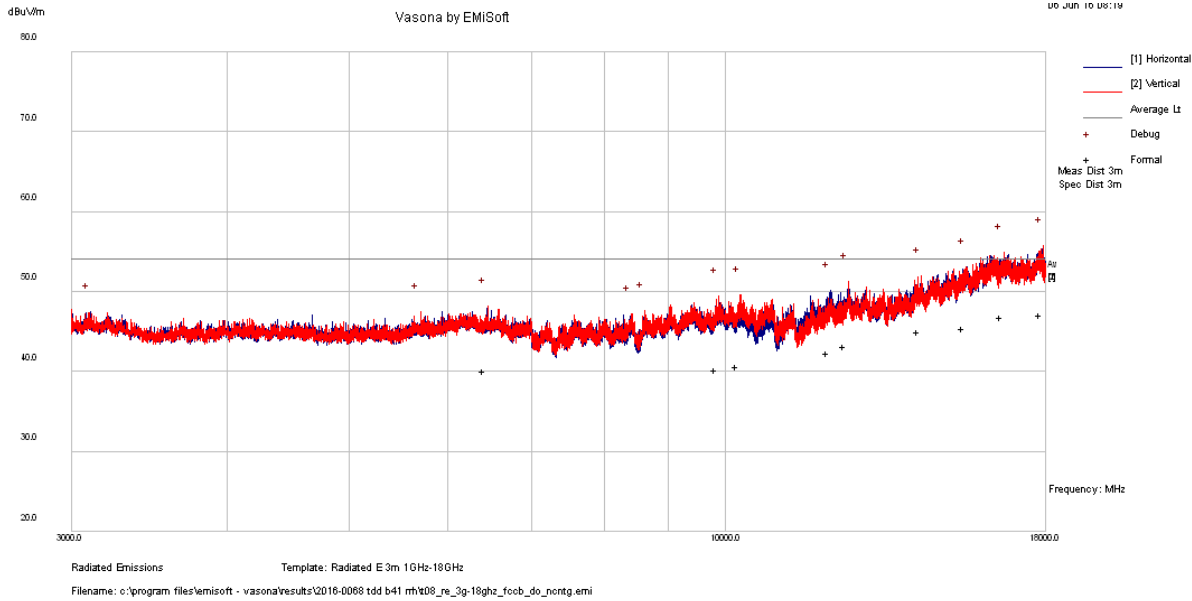
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
2664.65	46.05	3.12	-5.53	43.64	AvgMax	H	188	119	54	-10.36	Pass	Tx - exempt
2681.11	45.68	3.14	-5.51	43.3	AvgMax	H	216	57	54	-10.7	Pass	Tx - exempt
2635.51	44.86	3.08	-5.55	42.39	AvgMax	V	100	327	54	-11.61	Pass	Tx - exempt
2777.21	32.39	3.26	-5.44	30.21	AvgMax	V	302	359	54	-23.79	Pass	
1934.5	34.78	2.11	-7.41	29.48	AvgMax	V	366	321	54	-24.52	Pass	
2253.02	32.82	2.55	-6.3	29.07	AvgMax	V	122	181	54	-24.93	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
2664.55	63.5	3.12	-5.53	61.09	Preview	H	102	110	54	7.09	Fail	Tx - exempt
2688.34	63.1	3.15	-5.51	60.74	Preview	H	190	110	54	6.74	Fail	Tx - exempt
2632.83	62.37	3.08	-5.55	59.9	Preview	V	102	330	54	5.9	Fail	Tx - exempt
2777.95	47.55	3.26	-5.44	45.37	Preview	V	102	308	54	-8.63	Pass	
2252.24	48.23	2.54	-6.3	44.48	Preview	V	102	286	54	-9.52	Pass	
1933.15	49.66	2.11	-7.41	44.36	Preview	V	102	22	54	-9.64	Pass	
1944.4	48.39	2.11	-7.35	43.16	Preview	H	102	308	54	-10.84	Pass	
1827.06	48.58	2.06	-8.07	42.57	Preview	V	102	352	54	-11.43	Pass	
1360.08	49.2	1.8	-10.7	40.26	Preview	V	102	22	54	-13.74	Pass	
1039.38	50.31	1.55	-11.8	40.05	Preview	H	290	330	54	-13.95	Pass	
1276.49	49.1	1.74	-11	39.85	Preview	H	190	44	54	-14.15	Pass	
1155.93	49.47	1.65	-11.4	39.73	Preview	H	190	110	54	-14.27	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T08_RE_3GHz-18GHz_FCCpt15_ClassB_DO_Non-Contiguous



Results Title: Radiated E 3m 1GHz-18GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t08_re_3g-18ghz_fccb_do_ncntg.emi
Test Laboratory: GPCL AR5-MH 23C, 52%RH, 1000mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Non-Contiguous @ 2640MHz 20MHz BW w/ 64QAM + 2665MHz 10MHz BW QPSK/16QAM & 2685MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 1MHz RBW & 1MHz VBW; FCC Radiated Emissions (3GHz-18GHz) Class B limits with maintenance port covers off. HPF on preamp to block Tx signal.
Date: 2016-06-06 08:19:57

FORMAL DATA

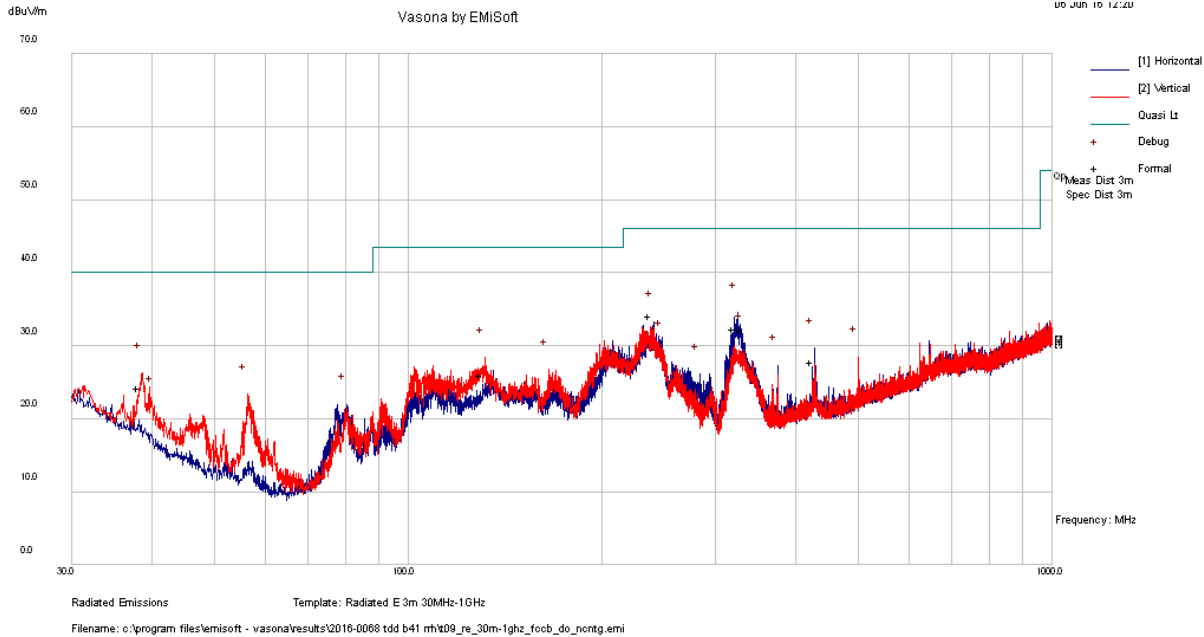
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
17949.7	29.4	9.56	4.67	43.63	AvgMax	V	392	324	54	-10.37	Pass	
16691.9	30	9.05	4.3	43.35	AvgMax	V	137	147	54	-10.65	Pass	
15570	30.28	8.82	2.96	42.07	AvgMax	V	266	286	54	-11.93	Pass	
14338.7	30.28	8.18	3.06	41.52	AvgMax	V	189	305	54	-12.48	Pass	
12534.5	30.28	7.77	1.74	39.8	AvgMax	V	301	92	54	-14.2	Pass	
12132.8	30.14	7.8	1	38.94	AvgMax	H	264	43	54	-15.06	Pass	
10282.4	30.28	7.58	-0.7	37.17	AvgMax	V	128	189	54	-16.83	Pass	
9878.64	30.56	7.57	-1.28	36.85	AvgMax	V	198	119	54	-17.15	Pass	
6450.02	33.32	5.48	-2.19	36.61	AvgMax	V	302	241	54	-17.39	Pass	

**PREVIEW
 DATA**

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
17951.2	41.44	9.56	4.67	55.67	Preview	V	302	154	54	1.67	Fail	
16687.5	41.6	9.05	4.3	54.95	Preview	V	390	352	54	0.95	Fail	
15574.4	41.3	8.82	2.97	53.09	Preview	V	102	176	54	-0.91	Pass	
14343	40.68	8.18	3.06	51.92	Preview	V	302	198	54	-2.08	Pass	
12539.4	41.71	7.77	1.75	51.23	Preview	V	390	286	54	-2.77	Pass	
12132.7	41.32	7.8	1	50.12	Preview	H	102	132	54	-3.88	Pass	
10287.3	42.72	7.58	-0.69	49.61	Preview	V	302	242	54	-4.39	Pass	
9879	43.09	7.57	-1.28	49.37	Preview	V	202	0	54	-4.63	Pass	
6453.43	44.82	5.48	-2.19	48.11	Preview	V	390	0	54	-5.89	Pass	
8616.31	43.1	6.71	-2.22	47.59	Preview	V	102	66	54	-6.41	Pass	
5703.53	44.84	5.52	-2.84	47.52	Preview	V	202	198	54	-6.48	Pass	
3111.44	47.88	4.77	-5.18	47.47	Preview	H	390	308	54	-6.53	Pass	
8421.8	42.89	6.53	-2.26	47.16	Preview	V	202	176	54	-6.84	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

T09_RE_30MHz-1GHz_FCCpt15_ClassB_DO_Non-Contiguous



Results Title: Radiated E 3m 30MHz-1GHz
File Name: c:\program files\emisoft - vasona\results\2016-0068 tdd b41 rrh\t09_re_30m-1ghz_fccb_do_ncntg.emi
Test Laboratory: GPCL AR5-MH 23C, 56%RH, 987mB
Test Engineer: KJH
Test Software: Vasona by EMISoft, version 2.161
Equipment: Nokia
EUT Details: LTE TDD Band 41 RRH 8x20W powered @ -48VDC, CPRI 1, 2 & 3 ports with fiber optic cables connected to BBU RRH 1, 2 & 3 ports inside control room, AISG & Alarm ports cabled & grounded to turntable, 6AWG wire attached to chassis ground, (8) Tx ports terminated with 50W loads. All Tx ports Non-Contiguous @ 2640MHz 20MHz BW w/ 64QAM + 2665MHz 10MHz BW QPSK/16QAM & 2685MHz 10MHz BW QPSK (20W).
Configuration: R&S ESIB40 Receiver (E704) with 120kHz RBW & 300kHz VBW; FCC Radiated Emissions (30MHz-1GHz) Class B limits with maintenance port covers off.
Date: 2016-06-06 12:52:51

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
239.635	40.61	7.15	-17.6	30.12	QuasiMax	H	237	220	46	-15.88	Pass	
324.509	38.84	7.35	-17.9	28.3	QuasiMax	H	230	240	46	-17.7	Pass	
331.834	38.53	7.37	-17.7	28.16	QuasiMax	H	166	223	46	-17.84	Pass	
38.555	31.71	6.5	-17.9	20.28	QuasiMax	V	141	208	40	-19.72	Pass	
131.371	29.2	6.79	-14	21.99	QuasiMax	V	235	13	43.5	-21.51	Pass	
429.12	31.08	7.59	-14.8	23.85	QuasiMax	H	237	213	46	-22.15	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
-------------	------------	------------	-------------	----------------	---------------	-----------	---------	----------	----------------	-------------	------------	----------

**PREVIEW
 DATA**

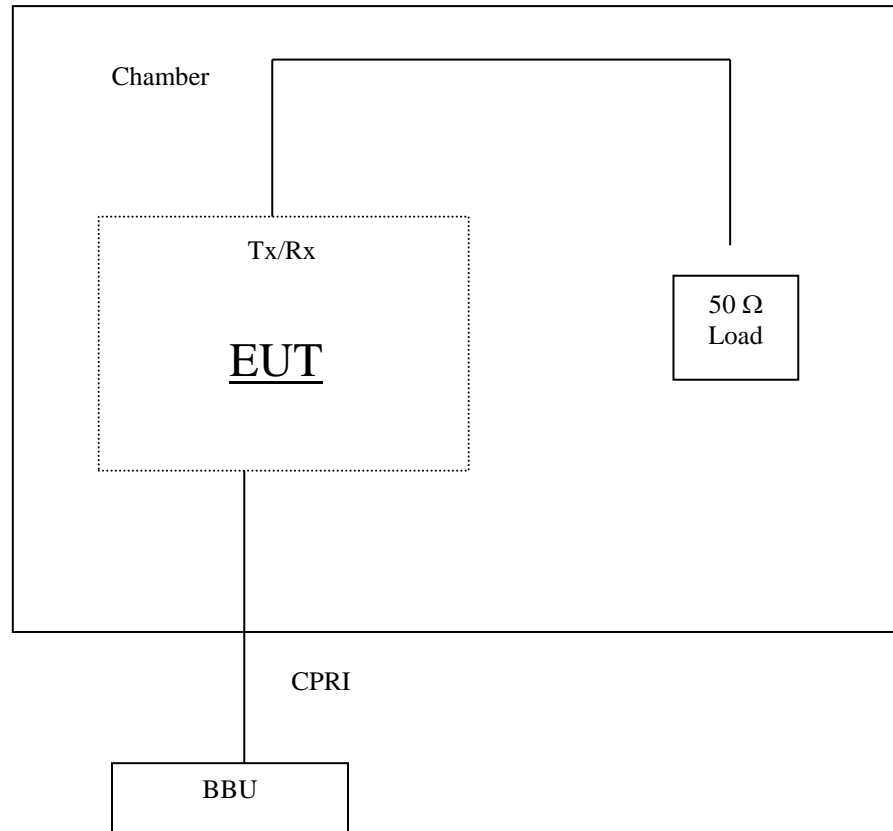
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
324.926	45.09	7.35	-17.9	34.55	Preview	H	190	225	46	-11.45	Pass	
241.238	43.55	7.15	-17.4	33.32	Preview	H	190	225	46	-12.68	Pass	
38.6573	37.71	6.5	-18	26.23	Preview	V	102	270	40	-13.77	Pass	
131.579	35.57	6.79	-14	28.37	Preview	V	102	315	43.5	-15.13	Pass	
332.621	40.65	7.37	-17.7	30.29	Preview	H	190	225	46	-15.71	Pass	
429.102	36.92	7.59	-14.8	29.68	Preview	H	102	0	46	-16.32	Pass	
249.415	38.23	7.17	-16.1	29.32	Preview	H	190	225	46	-16.68	Pass	
56.3567	41.41	6.5	-24.6	23.31	Preview	V	102	180	40	-16.69	Pass	
165.727	35.98	6.93	-16.1	26.77	Preview	V	102	180	43.5	-16.73	Pass	
500.092	34.62	7.72	-13.9	28.45	Preview	V	102	315	46	-17.55	Pass	
80.4048	38.22	6.62	-22.9	21.97	Preview	H	190	0	40	-18.03	Pass	
40.3888	34.17	6.49	-18.9	21.76	Preview	V	102	225	40	-18.24	Pass	
375.042	36.34	7.47	-16.5	27.33	Preview	H	102	225	46	-18.67	Pass	
284.333	37.25	7.25	-18.4	26.13	Preview	H	190	225	46	-19.87	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

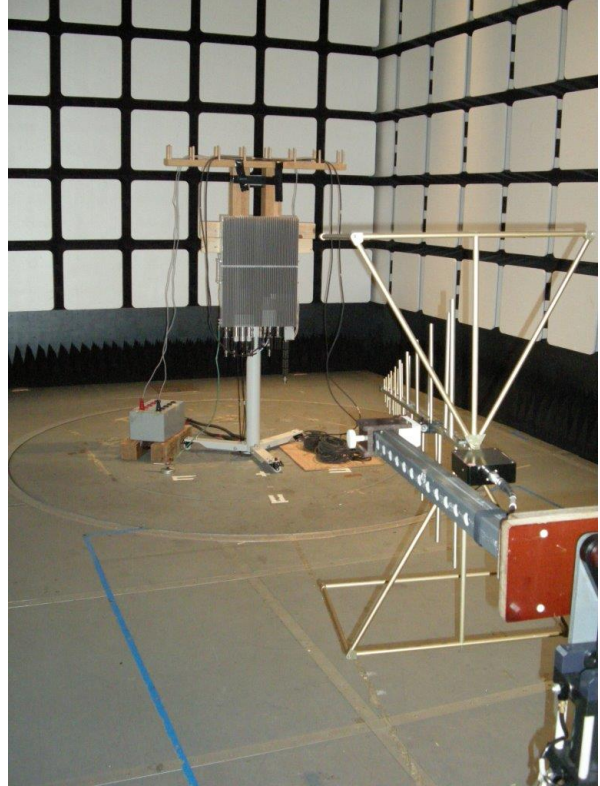
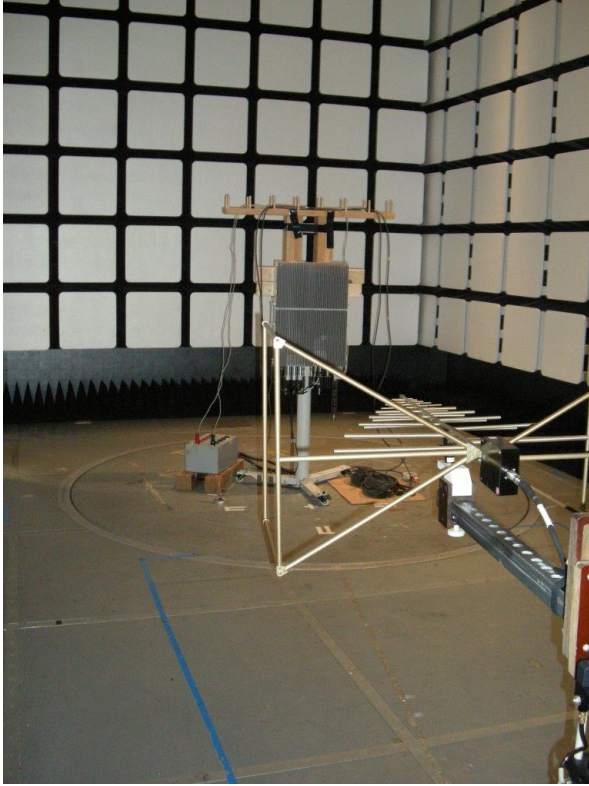
4.6.1 Field Strength of Radiated Emissions Results:

Over the frequency spectrum investigated no reportable radiated spurious emissions were detected. The measurement results of the EUT, subject of this application, demonstrate the full compliance with the Rules of the Commission.

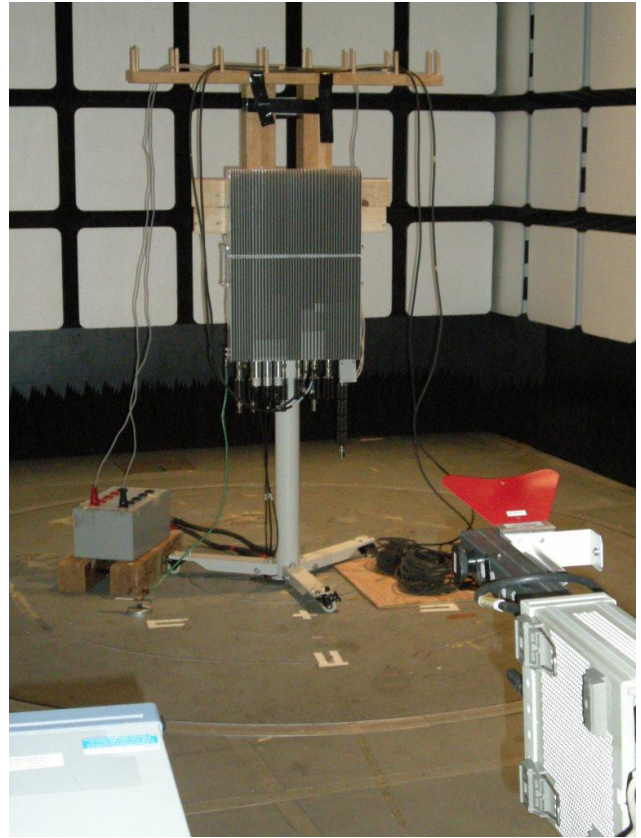
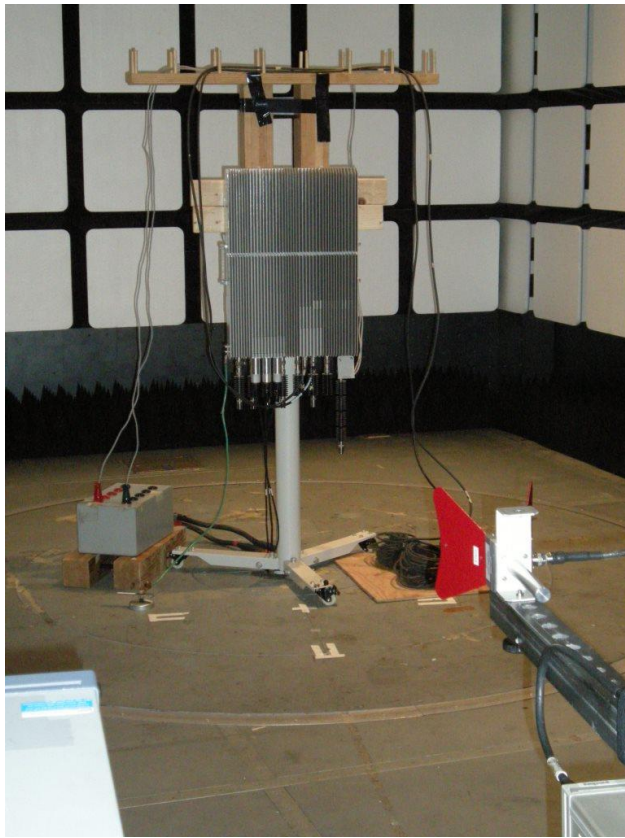
Figure 4.6.1 Test Set-Up for Measurement of Radiated Spurious Emissions



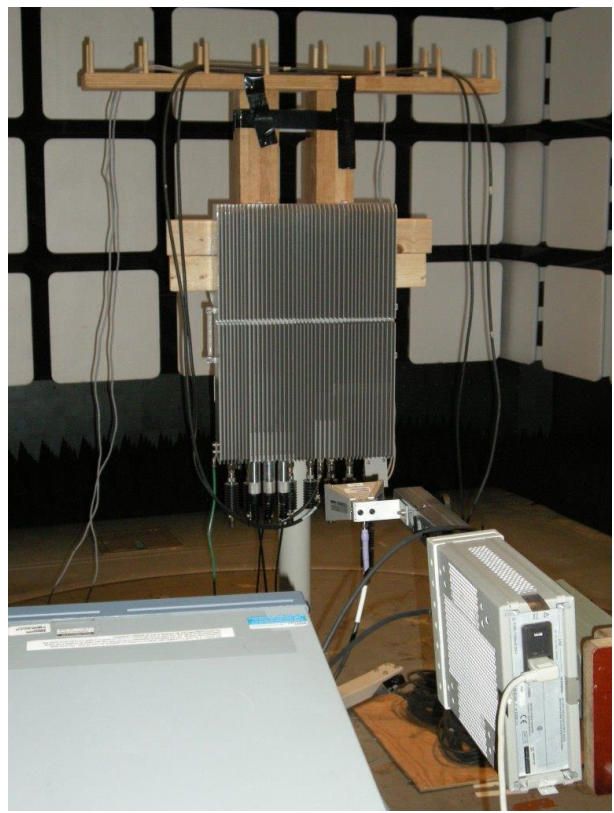
PHOTOGRAPHS OF EUT DURING FINAL RADIATED EMISSIONS TESTING
30 MHz – 1 GHz



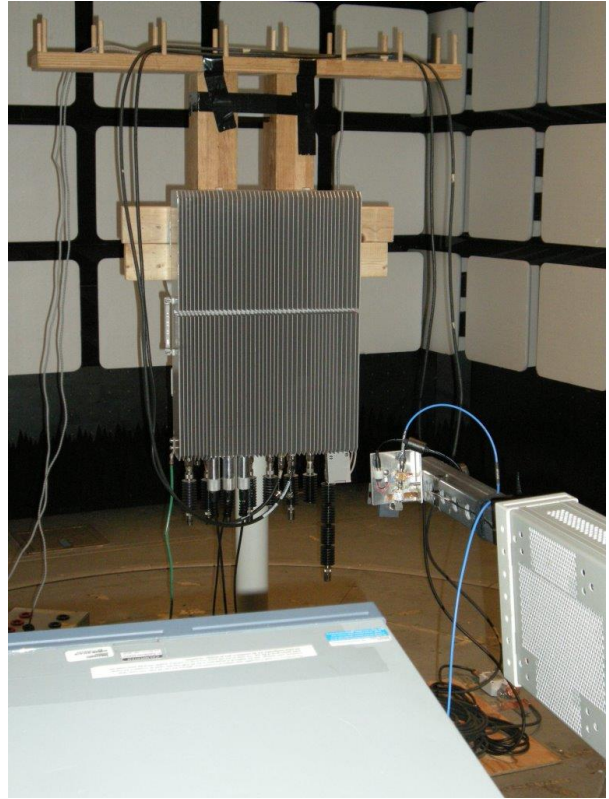
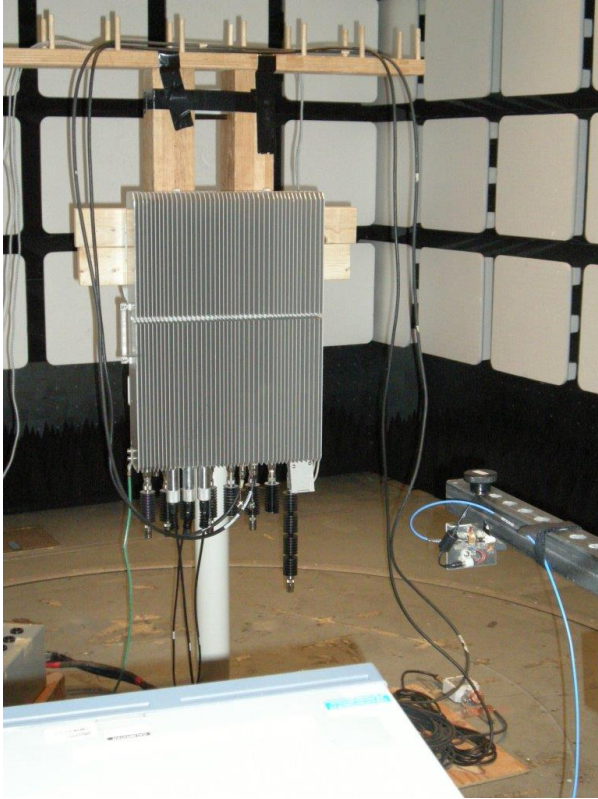
1 GHz – 18 GHz



18 GHz – 20 GHz



20 GHz – 27 GHz



4.7 LIST OF TEST EQUIPMENT

Table 5.1 List of Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due	Calibration Type	Status
E704	Rohde & Schwarz	Test Receiver	EMI (20Hz-40GHz) -150 to +30dBm	ESIB40	100121	2016-04-28	2018-04-28	Requires Calibration	Active
E507	Sonoma Instrument Co.	Amplifier	9kHz-1GHz	310	185794	2014-06-17	2016-06-17	Requires Calibration	Active
E889	Weinschel	Attenuator	6dB DC-18GHz 5 Watt	2-6	BX3438	2016-02-25	2018-02-25	Requires Calibration	Active
E601	A.H. Systems Inc.	Biological Antenna	25-2000MHz	SAS-521-2	408	2015-02-13	2017-02-13	Requires Calibration	Active
E123	Hewlett Packard	Pre-Amplifier	Preamplifier 1-26.5GHz	8449B	3008A00426	2015-11-20	2017-11-20	Requires Calibration	Active
E1073	ETS Lindgren	Horn Antenna	Double-Ridged Waveguide Horn 1-18GHz	3117	00135198	2014-12-10	2016-12-10	Requires Calibration	Active
E513	EMC Test Systems	Horn Antenna	Double Ridged Horn 18-40GHz	3116	2539	2015-03-19	2017-03-19	Requires Calibration	Active
E988	Trilithic	High Pass Filter	PCS	5HC2850/18050-1.8-KK	PCS-HPF-11	N/A	N/A	Calibration Not Required	Active
E1166	Agilent Technologies	Amplifier	Pre-Amplifier 1-26.5GHz	8449B	3008A01740	2016-02-25	2018-02-25	Requires Calibration	Active
E526	A.H. Systems Inc.	Horn Antenna	Ridged Horn 26.5GHz-40GHz	SAS-200/573	137	2015-06-01	2017-06-01	Requires Calibration	Active

4.8 FACILITIES AND ACCREDITATION

All measurement facilities at Alcatel-Lucent Global Product Compliance Laboratory (GPCL) used to collect the measurement data in the test report are located at 600-700 Mountain Avenue, Murray Hill, New Jersey 07974-0636 USA.

The field strength measurements of radiated spurious emissions are made in a FCC and IC registered three meter semi-anechoic chamber AR6 (FCC Site Registration Number: 515091, IC Filing Number: 6933F-7) which is maintained by Alcatel-Lucent in Murray Hill, New Jersey. The sites were constructed and are continuously in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

Alcatel-Lucent Global Product Compliance Laboratory is accredited with the US Department of Commerce National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 7 Code of Federal Regulations for offering test services for selected test methods in Electromagnetic Compatibility; Voluntary Control Council for Interference (VCCI), Japan; Australian Communications and Media Authority (ACMA). The laboratory is ISO 9001:2008 Certified.

**United States Department of Commerce
National Institute of Standards and Technology**



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100275-0

Alcatel-Lucent, Global Product Compliance Lab
Murray Hill, NJ

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2015-09-14 through 2016-09-30
Effective Dates




For the National Voluntary Laboratory Accreditation Program