Company: Itron, Inc.

Test of: NIC 510-06

To: FCC CFR 47 Part 15.247 (FHSS); RSS-247

Report No.: ITRO01-U2 Rev A

COMPLETE TEST REPORT

TEST REPORT

FROM

Test of: Itron, Inc. NIC 510-06

To: FCC CFR 47 Part 15.247 (FHSS); RSS-247

Test Report Serial No.: ITRO01-U2 Rev A

This report supersedes: NONE

Applicant: Itron, Inc.
230 West Tasman Drive
San Jose, California 95134
USA

Product function: Plug in Radio Device

Issue Date: 9th May 2018

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com

A2LA ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

Table of Contents

1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

ilac-MRA A2LA

Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

A2LA

Presented this 4th day of February 2016.

President and CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to May 31, 2018
Revised April 25, 2018

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	US0159 Listing #: 4143A-2 4143A-3
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	APEC MRA 2	RCB 210
	VCCI	--	--	A-0012
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

EU MRA – European Union Mutual Recognition Agreement.
NB – Notified Body
APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing
Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This product certification body also meets the *A2LA R322 - Specific Requirements - Notified Body Accreditation Requirements* and *A2LA R308 - Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 4th day of February 2016.

President and CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to May 31, 2018
Revised April 25, 2018

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	16th April 2018	Draft report for client review.
Rev A	9th May 2018	Initial release.
.		
.		
.		
.		
.		

In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer:	Itron, Inc. 230 West Tasman Drive San Jose California 95134 USA	**Tested By:**	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Model:	NIC 511-0603-13	**Telephone:**	+1 925 462 0304
Type Of Equipment:	Modular radio device	**Fax:**	+1 925 462 0306
S/N's:	0013500700001592		
Test Date(s):	26 - 29 March 2018	**Website:**	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15.247 (FHSS); RSS-247	EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

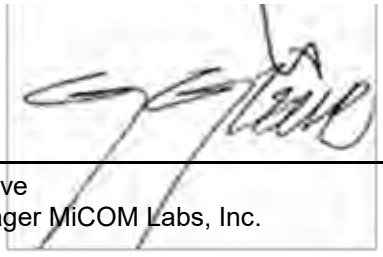
1. This document reports conditions under which testing was conducted and the results of testing performed.

2. Details of test methods used have been recorded and kept on file by the laboratory.

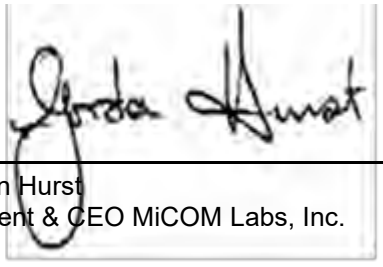
3. Test results apply only to the item(s) tested.

A2LA ACCREDITED
TESTING CERT #2381.01

Approved & Released for MiCOM Labs, Inc. by:



Graeme Grieve
Quality Manager MiCOM Labs, Inc.



Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	FCC 47 CFR Part 15.247	2016	Radio Frequency Devices; Subpart C – Intentional Radiators
II	FCC Public Notice DA 00-705	March 2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
III	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
IV	ANSI C63.4	2014	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
V	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
VI	FCC 47 CFR Part 15, Subpart B	2014	Title 47: Telecommunication PART 15—RADIO FREQUENCY DEVICES, SubPart B; Unintentional Radiators
VII	ICES-003	Issue 6 Jan 2016; Updated April 2017	Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement.
VIII	M 3003	Edition 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
IX	RSS-247 Issue 2	Feb 2017	Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices
X	RSS-Gen Issue 4; Amendment 1	March 2018	General Requirements for Compliance of Radio Apparatus
XI	FCC 47 CFR Part 2.1033	2016	FCC requirements and rules regarding photographs and test setup diagrams.
XII	A2LA	August 2017	R105 - Requirement's When Making Reference to A2LA Accreditation Status

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Details	Description
Purpose:	Test of the Itron, Inc. NIC 510-06 to FCC CFR 47 Part 15.247 (FHSS); Radio Frequency Devices; Subpart C – Intentional Radiators& RSS-247.
Applicant:	Itron, Inc. 230 West Tasman Drive San Jose California 95134 USA
Manufacturer:	Itron, Inc.
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	ITRO01-U2 Rev A
Date EUT received:	26th March 2018
Standard(s) applied:	FCC CFR 47 Part 15.247 (FHSS); RSS-247
Dates of test (from - to):	26 - 29 March 2018
No of Units Tested:	2
Product Family Name:	NIC 510-06;
Model(s):	NIC 511-0603-13; NIC 511-0602-14 (for USB testing)
Location for use:	Both
Declared Frequency Range(s):	902 - 928 MHz;
Type of Modulation:	FHSS; DTS
EUT Modes of Operation:	FSK;GFSK;2FSK;OQPSK;OFDM
Declared Nominal Output Power :	902 - 928 MHz: 30 dBm
Transmit/Receive Operation:	Transceiver – Half Duplex
Rated Input Voltage and Current:	4VDC
Operating Temperature Range:	-40 to +85 degrees C.
ITU Emission Designator:	FSK 138KF1D 2FSK 105KF1D OFDM3 310KF1D O-QPSK 253KF1D O-QPSK 138KF1D
Equipment Dimensions:	110mm x 45mm x 15mm
Weight:	50g
Hardware Rev:	173-0870-00
Software Rev:	4.4.0

5.2. Scope Of Test Program

Itron, Inc. NIC 511-0603-13

The scope of the test program was to test the Itron, Inc. NIC 511-0603-13 and NIC 511-0602-14 configurations in the frequency ranges 902 - 928 MHz for compliance against the following specification:

FCC CFR 47 Part 15.247 (FHSS); Radio Frequency Devices; Subpart C – Intentional Radiators

Industry Canada RSS-247
Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices

The EUT supports the following modes of operation:

100 kbps/FSK; 100 kbps/OQPSK; 150 kbps/FSK; 150 kbps/GFSK; 200 kbps/GFSK; 300 kbps/GFSK; 50 kbps/FSK; 6.25 kbps/OQPSK; 600 kbps/OFDM;

Only the lowest and highest data rates were tested to cover extreme ranges of the device.

The following product description was provided by Itron Inc.

The NIC 510-06 is a plug-in radio device, will communicate over mesh and HAN networks. May be integrated into host devices (i.e., FSU 5.0, IOTR 5, energy meters, etc.) to be used in Itron Smart Energy Networks (SEN). NIC 510-06 may be configured for host applications on USB or Serial data communications and may support standard or extended last gasp (ELG). The NIC 510-06 family supports basic meter types including single phase meters and three phase meters.

This report is intended to cover the NIC 510-06 family of products which includes the NIC 511-0603-13 and NIC 511-0602-14 and represents a worst case configuration of the product family.

NIC 510-06 products include the following model numbers/configurations:

NIC 511-0603: 900+2.4,INT/EXT ANT, HW1
NIC 511-0602: 900+2.4, EXT ANT,HW1
NIC 511-0601: 900+2.4, INT ANT, HW1
NIC 511-0601-13 : 900+2.4, INT ANT, HW1, 75s ELG
NIC 511-0602-13 : 900+2.4, EXT ANT, HW1, 75s ELG
NIC 511-0602-13 : 900+2.4, INT/EXT ANT,HW1, 75s ELG
NIC 511-0602-14 : 900+2.4, EXT ANT,HW1, USB

Itron, Inc. NIC 511-0603-13

5.3. Equipment Model(s) and Serial Number(s)

Type (EUT	Equipment Description	Serial Number
EUT	NIC 511-0603-13	0013500700001592
EUT	NIC 511-0602-14	00135007000013D5
Support	IOTR5 SBC	Proto1

5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	Tai Sheng Chen	155-0010-00	f type	1.2	-	360	-	902 - 928
external	WP	WPANT30017-CA	OMNI	3.0	-	360	-	902 - 928
external	WP	WPANT40020-SA	Wrap Around	1.0	-	360	-	902 - 928
BF Gain - Beamforming Gain Dir BW - Directional BeamWidth X-Pol - Cross Polarization								

5.5. Cabling and I/O Ports

Port Type	Max Cable Length	# of Ports	Screened	Conn Type	Data Type
RS232	0 (direct plug)	1	No	12-PIN	Packet Data
USB	0 (direct plug)	1	No	4-PIN	Packet Data

5.6. Test Configurations

Results for the following configurations are provided in this report:

Operational Mode(s)	Data Rate with Highest Power kbp/s	Channel Frequency (MHz)		
		Low	Mid	High
902 - 928 MHz				
FSK	100	902.3	915.2	926.9
OQPSK	25	902.4	915.2	927.6
FSK	150	902.4	915.2	927.6
GFSK	150	902.3	915.2	926.9
GFSK	200	902.3	915.2	926.9
GFSK	300	902.4	915.2	927.6
FSK	50	902.2	915.0	927.8
OQPSK	6.25	902.2	915.0	927.8
OFDM	600	902.4	915.2	927.6

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:
1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:
1. NONE

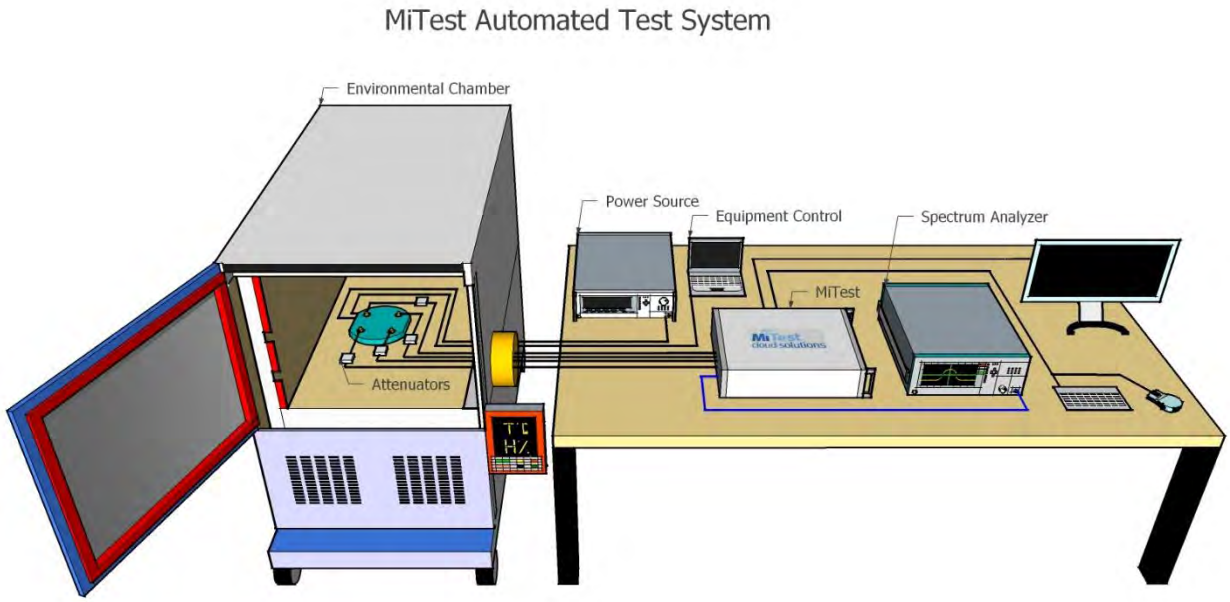
6. TEST SUMMARY

List of Measurements

Test Header	Result	Data Link
20 dB & 99% Bandwidth	Complies	View Data
Frequency Hopping Tests	Complies	View Data-
Number of Hopping Channels	Complies	View Data
Channel Separation	Complies	View Data
Dwell Time	Complies	View Data
Channel Occupancy	Complies	View Data
Output Power	Complies	View Data
Emissions	Complies	
(1) Conducted Emissions	Complies	
(i) Conducted Unwanted Spurious Emissions	Complies	View Data
(ii) Conducted Band-Edge Emissions	Complies	View Data
(2) Radiated Emissions	Complies	
(i) TX Spurious & Restricted Band Emissions	Complies	View Data
(ii) Digital Emissions (0.03 - 1 GHz)	Complies	View Data
(3) AC Wireline Emissions	Complies	View Data

7. TEST EQUIPMENT CONFIGURATION(S)

Conducted

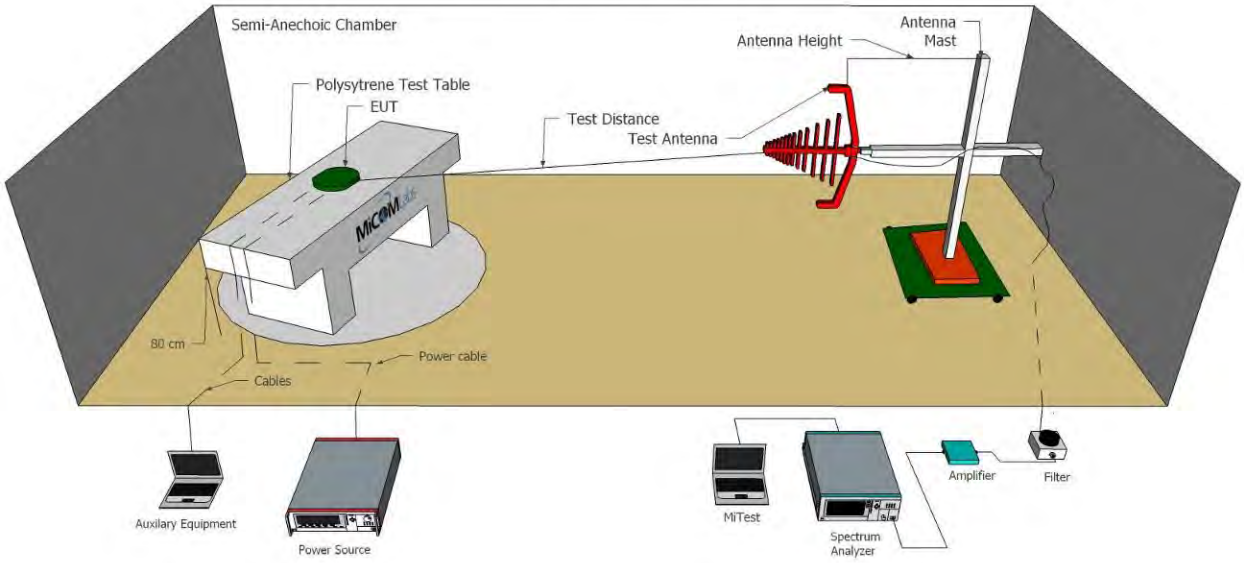


A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

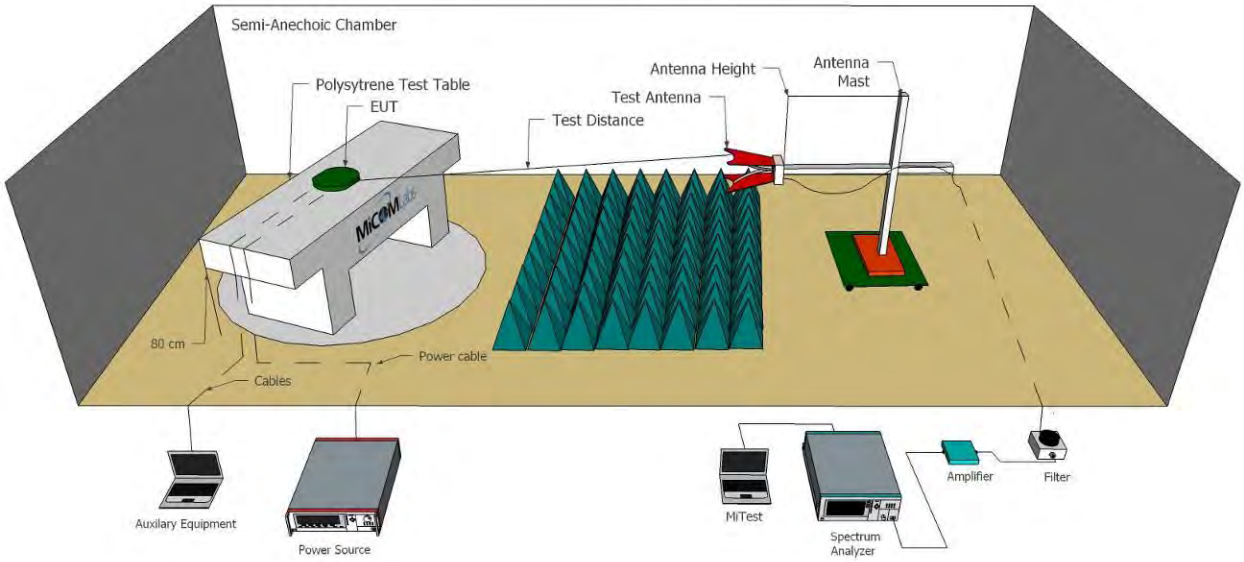
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
#3 SA	MiTest Box to SA	Fairview Microwave	SCA1814-0101-72	#3 SA	8 May 2018
#3P1	EUT to MiTest box port 1	Fairview Microwave	SCA1814-0101-72	#3P1	8 May 2018
#3P2	EUT to MiTest box port 2	Fairview Microwave	SCA1814-0101-72	#3P2	8 May 2018
#3P3	EUT to MiTest box port 3	Fairview Microwave	SCA1814-0101-72	#3P3	8 May 2018
#3P4	EUT to MiTest box port 4	Fairview Microwave	SCA1812-0101-72	#3P4	8 May 2018
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	30 Oct 2018
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Dec 2018
398	MiTest RF Conducted Test Software	MiCOM	MiTest ATS	Version 4.1	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
436	USB Wideband Power Sensor	Boonton	55006	8731	14 Sep 2018
441	USB Wideband Power Sensor	Boonton	55006	9179	20 Sep 2018
443	4x4 RF Switch Box	MiCOM Labs	MiTest 4X4 RF Switch Box	MIC003	8 May 2018
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
461	Spectrum Analyzer	Agilent	E4440A	MY46185537	20 Sep 2018
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2018
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	24 Dec 2018

Radiated Emissions - 3m Chamber

Radiated Emissions Below 1GHz Test Setup



Radiated Emissions Above 1GHz Test Setup



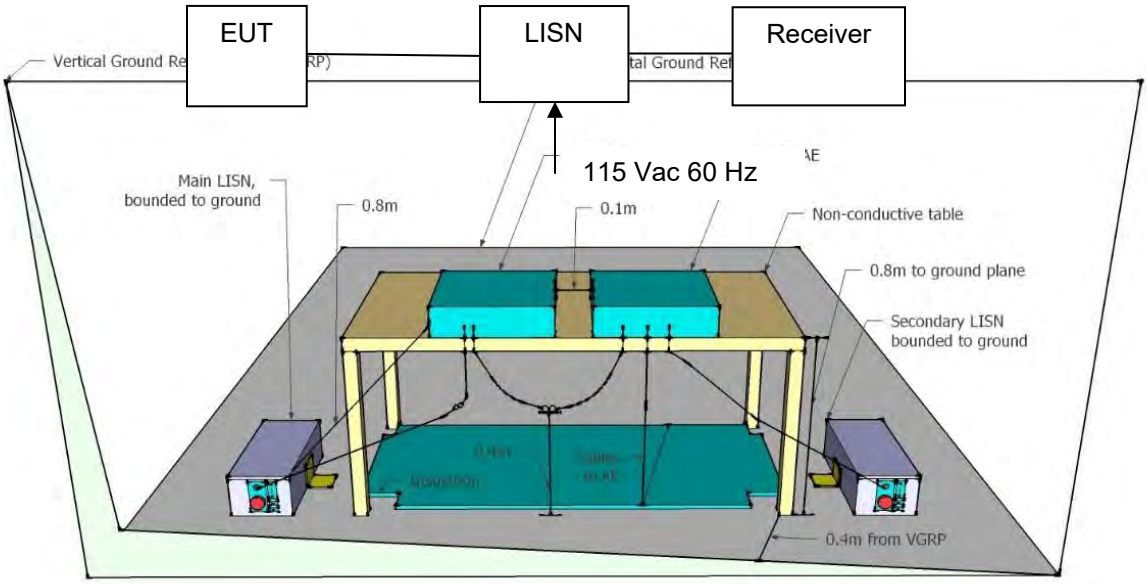
.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	28 Apr 2018
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	5 Oct 2018
341	900MHz Notch Filter	EWT	EWT-14-0199	H1	6 Oct 2018
346	1.6 TO 10GHz High Pass Filter	EWT	EWT-57-0112	H1	6 Oct 2018
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	12 Oct 2018
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Oct 2018
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	12 Oct 2018
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
447	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	4 Oct 2018
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	4 Oct 2018
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	4 Oct 2018
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	6 Oct 2018
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	6 Oct 2018
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	6 Oct 2018
482	Cable - Amp to Antenna	SRC Haverhill	157-3051574	482	6 Oct 2018
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2018
CC05	Confidence Check	MiCOM	CC05	None	19 Jul 2018

Ac Wireline Emissions

The ac Wireline Conducted Emissions test was performed using the conducted test set-up shown in the diagram below.

Test Measurement Set up



Assets Utilized for ac Wireline Emission Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	30 Nov 2018
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	6 Oct 2018
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	18 Oct 2018
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	6 Oct 2018
316	Dell desktop computer workstation	Dell	Desktop	WS04	Not Required
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
388	LISN (3 Phase) 9kHz - 30MHz	Rohde & Schwarz	ESH2-Z5	892107/022	20 Oct 2018
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0	496	Not Required
CCEMC01	Confidence Check.	MiCOM	CCEMC01	None	2 Jul 2018

8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.

The MiCOM Labs "MiTest" Automated Test System" (Patent Pending)

9. TEST RESULTS

9.1. 20 dB & 99% Bandwidth

Conducted Test Conditions for 20 dB and 99% Bandwidth			
Rules and Sections:	FCC CFR 47:15.247 ISED RSS-247:5.1	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	20 dB and 99 % Bandwidth	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	ANSI C63.10:2013:Sect 7.8.7 Public Notice DA 00-705	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for 20 dB and 99% Bandwidth Measurement

The bandwidth at 20 dB and 99 % was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up specified in this document.

20 dB Bandwidth

Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on channel
RBW = 1% of the 20 dB bandwidth
VBW = 3x RBW
Sweep = auto
Detector function = peak
Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

Occupied bandwidth—Power bandwidth (99%) measurement procedure[30]

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring (99%) power bandwidth:31

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of 1.5 × OBW is sufficient).

b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.1.5.2.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) Set the detection mode to peak, and the trace mode to max-hold.

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

Equipment Configuration for 20 dB 99% Bandwidth			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 20 dB Bandwidth (MHz) Port(s)				20 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	MHz	MHz
902.3	0.155				0.155	0.155	0.5	-0.34
915.2	0.155				0.155	0.155	0.5	-0.34
926.9	0.155				0.155	0.155	0.5	-0.34

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
902.3	0.138				0.138		
915.2	0.137				0.137		
926.9	0.136				0.136		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 20 dB 99% Bandwidth			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 20 dB Bandwidth (MHz) Port(s)				20 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	MHz	MHz
902.2	0.124				0.124	0.124	0.5	-0.38
915.0	0.124				0.124	0.124	0.5	-0.38
927.8	0.124				0.124	0.124	0.5	-0.38

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
902.2	0.105				0.105		
915.0	0.105				0.105		
927.8	0.105				0.105		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 20 dB 99% Bandwidth			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 20 dB Bandwidth (MHz) Port(s)				20 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	MHz	MHz
902.4	0.364				0.364	0.364	0.5	-0.14
915.2	0.366				0.366	0.366	0.5	-0.13
927.6	0.367				0.367	0.367	0.5	-0.13

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
902.4	0.301				0.301		
915.2	0.306				0.306		
927.6	0.309				0.309		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 20 dB 99% Bandwidth			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 20 dB Bandwidth (MHz) Port(s)				20 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	MHz	MHz
902.4	0.271				0.271	0.271	0.5	-0.23
915.2	0.271				0.271	0.271	0.5	-0.23
927.6	0.271				0.271	0.271	0.5	-0.23

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
902.4	0.253				0.253		
915.2	0.253				0.253		
927.6	0.253				0.253		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 20 dB 99% Bandwidth			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 20 dB Bandwidth (MHz) Port(s)				20 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	MHz	MHz
902.2	0.159				0.159	0.159	0.5	-0.34
915.0	0.159				0.159	0.159	0.5	-0.34
927.8	0.158				0.158	0.158	0.5	-0.34

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
902.2	0.138				0.138		
915.0	0.138				0.138		
927.8	0.138				0.138		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.2. Frequency Hopping Tests

Conducted Test Conditions for Frequency Hopping Measurements			
Rules and Sections:	FCC CFR 47:15.247 (a)(1)(i)/(iii) ISED RSS-247:5.1	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Frequency Hopping Tests	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	Public Notice DA 00-705	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References,		

Test Procedure for Frequency Hopping Measurements

These tests cover the following measurements:

i) channel separation
ii) channel occupancy
iii) dwell time
iv) number of hopping frequencies

Frequency hopping testing was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency or hopping mode.

Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up specified in this document.

Carrier Frequency Separation

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) □ 1% of the span
Video (or Average) Bandwidth (VBW) □ RBW
Sweep = auto
Detector function = peak
Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

Number of Hopping Frequencies

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW = 1% of the span
VBW = RBW
Sweep = auto
Detector function = peak
Trace = max hold

Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

Time of Occupancy (Dwell Time)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel
RBW = 1 MHz
VBW = RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s). An oscilloscope may be used instead of a spectrum analyzer.

9.2.1. Number of Hopping Channels

Equipment Configuration for Number of Hopping Channels			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Frequency Range (MHz)	Number of Hopping Channels	Limit (Minimum)	Pass / Fail
902-928	83	50	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Number of Hopping Channels			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Frequency Range (MHz)	Number of Hopping Channels	Limit (Minimum)	Pass / Fail
902-928	129	**50**	**Pass**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Number of Hopping Channels			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Frequency Range (MHz)	Number of Hopping Channels	Limit (Minimum)	Pass / Fail
902-928	63	**50**	**Pass**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Number of Hopping Channels			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Frequency Range (MHz)	Number of Hopping Channels	Limit (Minimum)	Pass / Fail
902.0-928.0	63	**50**	**Pass**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Number of Hopping Channels			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Frequency Range (MHz)	Number of Hopping Channels	Limit (Minimum)	Pass / Fail
902.0-928.0	129	**50**	**Pass**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.2.2. Channel Separation

Equipment Configuration for Channel Separation			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Center Frequency (MHz)	Chan Separation (MHz)	Limit (MHz) Minimum	Pass / Fail
915.0	0.300	0.025	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Channel Separation			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Center Frequency (MHz)	Chan Separation (MHz)	Limit (MHz) Minimum	Pass / Fail
915.0	0.200	0.025	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Channel Separation			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Center Frequency (MHz)	Chan Separation (MHz)	Limit (MHz) Minimum	Pass / Fail
915.2	0.400	0.025	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Channel Separation			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Center Frequency (MHz)	Chan Separation (MHz)	Limit (MHz) Minimum	Pass / Fail
915.2	0.400	0.025	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Channel Separation			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Center Frequency (MHz)	Chan Separation (MHz)	Limit (MHz) Minimum	Pass / Fail
915.0	0.200	0.025	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.2.3. Dwell Time & Channel Occupancy

Equipment Configuration for Dwell Time & Channel Occupancy

Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	
Engineering Test Notes:			

Test Measurement Results

Channel Frequency(MHz)	Dwell Time (Single Burst) (S)	Channel Occupancy (mS)	Observation Period (S)	Channel Occupancy Limit (mS)	Pass / Fail
902.3	0.008	64.00	20.000	400.000	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	
Measurement Uncertainty:	

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Dwell Time & Channel Occupancy			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99.0	**Tested By:**	
Engineering Test Notes:			

Test Measurement Results

Channel Frequency(MHz)	Dwell Time (Single Burst) (S)	Channel Occupancy (mS)	Observation Period (S)	Channel Occupancy Limit (mS)	Pass / Fail
915.2	0.015	90.00	20.000	400.000	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	
Measurement Uncertainty:	

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Dwell Time & Channel Occupancy			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency(MHz)	Dwell Time (Single Burst) (S)	Channel Occupancy (mS)	Observation Period (S)	Channel Occupancy Limit (mS)	Pass / Fail
915.2	0.003	45.000	20.000	400.000	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	
Measurement Uncertainty:	

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Dwell Time & Channel Occupancy			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99	**Tested By:**	
Engineering Test Notes:			

Test Measurement Results

Channel Frequency(MHz)	Dwell Time (Single Burst) (S)	Channel Occupancy (mS)	Observation Period (S)	Channel Occupancy Limit (mS)	Pass / Fail
915.20	0.040	0.300	20.00	400.000	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	
Measurement Uncertainty:	

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Channel Occupancy			
Variant:	FHSS	**Antenna:**	Not Applicable
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
Duty Cycle (%):	99	**Tested By:**	
Engineering Test Notes:			

Test Measurement Results

Channel Frequency(MHz)	Dwell Time (Single Burst) (S)	Channel Occupancy (mS)	Observation Period (S)	Channel Occupancy Limit (mS)	Pass / Fail
915.0	0.053	212.00	20.00	400.000	Pass

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	
Measurement Uncertainty:	

Note: click the links in the above matrix to view the graphical image (plot).

9.3. Output Power

Conducted Test Conditions for Fundamental Emission Output Power			
Rules and Sections:	FCC CFR 47: 15.247 (a)(1), (b)(1)/(2)/(3) ISED RSS-247:5.4	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	Public Notice DA 00-705	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices

Peak Output Power

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. The limit is specified in one of the subparagraphs of this Section. Submit this plot. A peak responding power meter may be used instead of a spectrum analyzer

Equipment Configuration for Output Power Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	1.00
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dB	
902.3	29.52				29.52	30.00	-0.48	28.00
915.2	29.87				29.87	30.00	-0.13	28.00
926.9	29.67				29.67	30.00	-0.33	28.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

Equipment Configuration for Output Power Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	1.00
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dB	
902.2	29.55				29.55	30.00	-0.45	28.00
915.0	29.54				29.54	30.00	-0.46	28.00
927.8	29.71				29.71	30.00	-0.29	28.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

Equipment Configuration for Output Power Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	1.00
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dB	
902.4	29.21				29.21	30.00	-0.79	28.00
915.2	29.23				29.23	30.00	-0.77	28.00
927.8	29.06				29.06	30.00	-0.94	28.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

Equipment Configuration for Output Power Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	1.00
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dB	
902.4	29.36				29.36	30.00	-0.64	28.00
915.2	29.71				29.71	30.00	-0.29	28.00
927.6	29.44				29.44	30.00	-0.56	28.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

Equipment Configuration for Output Power Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	1.00
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dB	
902.2	29.46				29.46	30.00	-0.54	28.00
915.0	29.61				29.61	30.00	-0.39	28.00
927.8	29.37				29.37	30.00	-0.63	28.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

9.4. Emissions

9.4.1. Conducted Emissions

Conducted Test Conditions for Transmitter Conducted Spurious and Band-Edge Emissions			
Rules and Sections:	FCC CFR 47:15.247 (d) ISED RSS-247:5.5	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Transmitter Conducted Spurious and Band-Edge Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	Public Notice DA 00-705	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Conducted Spurious and Band-Edge Emissions

Conducted Spurious and Band-Edge Emissions were measured with a spectrum analyzer connected to the antenna terminal, while the EUT is operating in transmission mode at the appropriate frequency. Band-Edge Emissions were also tested with the EUT in hopping mode.

Test configuration and setup used for the measurement was per the Conducted Test Set-up specified in this document.

Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge.

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section. Submit this plot. Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit. Submit this plot.

Spurious RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions.

RBW = 100 kHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section. Submit these plots.

9.4.1.1. Conducted Unwanted Spurious Emissions

Equipment Configuration for Unwanted Emissions Peak

Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Frequency Range	Unwanted Emissions Peak (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
902.3	30.0 - 10000.0	-38.845	8.36						
915.2	30.0 - 10000.0	-32.304	9.43						
926.9	30.0 - 10000.0	-32.359	9.12						

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Unwanted Emissions Peak			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Frequency Range	Unwanted Emissions Peak (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
902.2	30.0 - 10000.0	-32.717	8.16						
915.0	30.0 - 10000.0	-32.534	9.34						
927.8	30.0 - 10000.0	-31.810	8.86						

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Unwanted Emissions Peak			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Frequency Range	Unwanted Emissions Peak (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
902.4	30.0 - 10000.0	-43.140	3.55						
915.2	30.0 - 10000.0	-31.983	5.00						
927.6	30.0 - 10000.0	-33.093	4.80						

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Unwanted Emissions Peak			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Frequency Range	Unwanted Emissions Peak (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
902.4	30.0 - 10000.0	-32.990	8.05						
915.2	30.0 - 10000.0	-32.211	9.34						
927.6	30.0 - 10000.0	-32.239	8.79						

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Unwanted Emissions Peak			
Variant:	FHSS	**Duty Cycle (%):**	99
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Frequency Range	Unwanted Emissions Peak (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
902.2	30.0 - 10000.0	-33.187	7.95						
915.0	30.0 - 10000.0	-32.685	9.11						
927.8	30.0 - 10000.0	-32.473	8.60						

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.4.1.2. Conducted Band-Edge Emissions

Equipment Configuration for Conducted Low Band-Edge Emissions (Hopping) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.3 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-4.69	8.65	902.10			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Static) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.3 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-7.18	8.39	902.10			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Hopping) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	926.9 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-29.87	9.94	927.10			-0.900

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Static) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	100.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	926.9 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-29.33	9.56	927.20			-0.800

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Hopping) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.2 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	5.30	8.34	902.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

M1 is the highest emission measured with respect to the emissions limit at or below the Band Edge.

Equipment Configuration for Conducted Low Band-Edge Emissions (Static) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.2 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	5.12	8.35	902.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

M1 is the highest emission measured with respect to the emissions limit at or below the Band Edge.

Equipment Configuration for Conducted Upper Band-Edge Emissions (Hopping) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.8 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	8.72	8.99	928.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

M3 is the highest emission measured with respect to the emissions limit at or above the Band Edge.

Equipment Configuration for Conducted Upper Band-Edge Emissions (Static) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	50.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	2FSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.8 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	6.16	8.88	928.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

M3 is the highest emission measured with respect to the emissions limit at or above the Band Edge.

Equipment Configuration for Conducted Low Band-Edge Emissions (Hopping) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.4 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-12.12	2.29	902.10			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Static) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.4 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-6.23	5.65	902.10			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Hopping) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.6 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-4.70	6.13	927.90			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Static) Peak

Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	600.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM3	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.6 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-1.77	6.74	927.90			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Hopping) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.4 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-10.32	8.22	902.10			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Static) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.4 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-10.94	8.27	902.10			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Hopping) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.6 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	0.76	9.04	927.90			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Static) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	25.00 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.6 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-9.68	8.87	927.90			-0.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Hopping) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.2 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	7.63	8.09	902.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Low Band-Edge Emissions (Static) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.2 MHz					
Band-Edge Frequency:	902.0 MHz					
Test Frequency Range:	875.0 - 905.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	7.32	8.24	902.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Hopping) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.8 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 960.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	7.89	8.75	928.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Conducted Upper Band-Edge Emissions (Static) Peak			
Variant:	FHSS	**Duty Cycle (%):**	99.0
Data Rate:	6.25 KBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OQPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	927.8 MHz					
Band-Edge Frequency:	928.0 MHz					
Test Frequency Range:	925.0 - 950.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	8.18	8.82	928.00			**0.000**

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.4.2. Radiated Emissions

Radiated Test Conditions for Radiated Spurious Emissions (Restricted Bands)			
Rules and Sections:	FCC CFR 47: Part 15.205 ISED RSS-GEN:8.9, 8.10	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Radiated Spurious Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	ANSI C63.10: 6.3, 6.5 & 6.6	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)

Testing 30 – 10,000 MHz was performed in an anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.

Test configuration and setup for Radiated Spurious and Band-Edge Measurement were per the Radiated Test Set-up specified in this document.

Limits for Restricted Bands
Peak emission: 74 dBuV/m
Average emission: 54 dBuV/m

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.
FS = R + AF + CORR - FO

where:
FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Example:
Given receiver input reading of 51.5 dBmV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength (FS) of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBmV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 mV/m

Restricted Bands of Operation (15.205)

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	**MHz**	**MHz**	**GHz**
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

9.4.2.1. TX Spurious & Restricted Band Emissions

Integral Antenna (Tai Sheng Chen 155-0010-00)

30-1000 MHz:

Equipment Configuration for Radiated Spurious Emissions			
Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	902.30	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	850.28	42.86	6.11	-8.30	40.67	MaxQP	Horizontal	98	285	46.0	-5.3	Pass
#2	870.31	40.91	6.17	-8.10	38.98	MaxQP	Horizontal	108	284	46.0	-7.0	Pass
#3	902.30	42.37	6.24	-8.00	40.61	Fundamental	Horizontal	100	0	--	--	
#4	954.34	42.27	6.37	-7.27	41.37	MaxQP	Horizontal	221	335	46.0	-4.6	Pass
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions

Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	915.20	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	863.24	45.09	6.13	-8.14	43.08	MaxQP	Horizontal	98	286	46.0	-2.9	Pass
#2	870.29	40.15	6.17	-8.10	38.22	MaxQP	Horizontal	98	290	46.0	-7.8	Pass
#3	915.20	37.52	6.25	-7.82	35.95	Fundamental	Horizontal	100	0	--	--	
#4	955.52	37.85	6.37	-7.17	37.05	MaxQP	Horizontal	217	338	46.0	-9.0	Pass
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.												

Note: click the links in the above matrix to view the graphical image (plot).

E Equipment Configuration for Radiated Spurious Emissions			
Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.90	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	862.89	46.86	6.14	-8.15	44.85	MaxQP	Horizontal	98	283	46.0	-1.2	Pass
#2	926.92	78.18	6.28	-7.64	76.82	Fundamental	Horizontal	100	0	--	--	
#3	952.86	43.50	6.37	-7.26	42.61	MaxQP	Horizontal	218	346	46.0	-3.4	Pass
#4	958.87	43.86	6.39	-7.28	42.97	MaxQP	Horizontal	157	348	46.0	-3.0	Pass
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions			
Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	Hopping	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	855.95	44.67	6.11	-8.23	42.55	Peak (NRB)	Vertical	100	0	--	--	Pass
#2	903.55	46.83	6.23	-7.81	45.25	Peak (NRB)	Vertical	100	0	--	--	Pass
#3	926.37	73.58	6.28	-7.64	72.22	Peak (NRB)	Vertical	100	0	--	--	Pass
#4	958.78	44.07	6.39	-7.28	43.18	Peak (NRB)	Vertical	100	0	--	--	Pass
Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.												

Note: click the links in the above matrix to view the graphical image (plot).

1-10 GHz:

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	902.30	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	2706.89	62.63	2.35	-11.97	53.01	Max Peak	Horizontal	99	319	74.0	-21.0	Pass
#2	2706.89	61.08	2.35	-11.97	51.46	Max Avg	Horizontal	99	319	54.0	-2.5	Pass
#3	5413.82	55.47	3.15	-11.79	46.83	Max Peak	Vertical	188	353	74.0	-27.2	Pass
#4	5413.82	49.01	3.15	-11.79	40.37	Max Avg	Vertical	188	353	54.0	-13.6	Pass
#5	6316.28	63.48	3.27	-9.12	57.63	Peak (NRB)	Vertical	100	0	--	--	Pass
Test Notes: EUT powered by 4 volt DC												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	915.20	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	2745.59	63.14	2.39	-11.96	53.57	Max Peak	Horizontal	105	320	74.0	-20.4	Pass
#2	2745.59	61.65	2.39	-11.96	52.08	Max Avg	Horizontal	105	320	54.0	-1.9	Pass
#3	4576.21	56.65	2.93	-12.01	47.57	Max Peak	Horizontal	101	138	74.0	-26.4	Pass
#4	4576.21	51.08	2.93	-12.01	42.00	Max Avg	Horizontal	101	138	54.0	-12.0	Pass
#5	5491.38	55.23	3.17	-11.50	46.90	Peak (NRB)	Vertical	100	0	--	--	Pass
#6	6406.20	65.55	3.18	-9.21	59.52	Peak (NRB)	Vertical	100	0	--	--	Pass
#7	8237.12	52.43	3.96	-7.31	49.08	Max Peak	Vertical	194	220	74.0	-24.9	Pass
#8	8237.12	44.05	3.96	-7.31	40.70	Max Avg	Vertical	194	220	54.0	-13.3	Pass
Test Notes: EUT powered by 4 volt DC												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.90	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	2780.71	61.78	2.40	-11.93	52.25	Max Peak	Horizontal	101	317	74.0	-21.8	Pass
#2	2780.71	59.53	2.40	-11.93	50.00	Max Avg	Horizontal	101	317	54.0	-4.0	Pass
#3	4634.46	60.19	2.93	-12.23	50.89	Max Peak	Horizontal	100	108	74.0	-23.1	Pass
#4	4634.46	57.01	2.93	-12.23	47.71	Max Avg	Horizontal	100	108	54.0	-6.3	Pass
#5	5561.43	53.18	3.16	-11.30	45.04	Peak (NRB)	Vertical	100	90	--	--	Pass
#6	6488.51	65.42	3.13	-8.96	59.59	Peak (NRB)	Vertical	100	0	--	--	Pass
#7	7415.23	52.12	3.54	-7.93	47.73	Max Peak	Vertical	119	153	74.0	-26.3	Pass
#8	7415.23	44.58	3.54	-7.93	40.19	Max Avg	Vertical	119	153	54.0	-13.8	Pass
#9	8342.07	54.70	3.99	-8.08	50.61	Max Peak	Vertical	197	66	74.0	-23.4	Pass
#10	8342.07	47.92	3.99	-8.08	43.83	Max Avg	Vertical	197	66	54.0	-10.2	Pass
Test Notes: EUT powered by 4 volt DC												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FSK
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	Hopping	**Data Rate:**	0.00 MBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	1823.32	61.78	2.01	-14.14	49.65	Peak (NRB)	Horizontal	100	0	--	--	Pass
#2	2718.77	62.71	2.37	-12.06	53.02	Max Peak	Horizontal	183	321	74.0	-21.0	Pass
#3	2718.77	42.26	2.37	-12.06	32.57	Max Avg	Horizontal	183	321	54.0	-21.4	Pass
#4	2731.10	59.02	2.38	-12.06	49.34	Max Peak	Horizontal	168	157	74.0	-24.7	Pass
#5	2731.10	39.96	2.38	-12.06	30.28	Max Avg	Horizontal	168	157	54.0	-23.7	Pass
#6	2749.22	55.60	2.39	-11.95	46.04	Max Peak	Horizontal	138	101	74.0	-28.0	Pass
#7	2749.22	38.09	2.39	-11.95	28.53	Max Avg	Horizontal	138	101	54.0	-25.5	Pass
#8	4616.35	56.10	2.94	-11.91	47.13	Max Peak	Horizontal	113	300	74.0	-26.9	Pass
#9	4616.35	39.00	2.94	-11.91	30.03	Max Avg	Horizontal	113	300	54.0	-24.0	Pass
#10	6332.78	57.04	3.23	-9.29	50.98	Peak (NRB)	Horizontal	100	92	--	--	Pass
#11	6450.22	57.36	3.14	-9.10	51.40	Peak (NRB)	Vertical	100	92	--	--	Pass
#12	8336.66	54.80	3.98	-8.12	50.66	Max Peak	Horizontal	186	98	74.0	-23.3	Pass
#13	8336.66	37.81	3.98	-8.12	33.67	Max Avg	Horizontal	186	98	54.0	-20.3	Pass
Test Notes: EUT powered by 4V DC. Hopping												

Note: click the links in the above matrix to view the graphical image (plot).

OMNI Antenna (WPANT30017-CA)

30-1000 MHz

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	902.30	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	774.26	38.10	5.93	-9.45	34.58	MaxQP	Vertical	257	25	46.0	-11.4	Pass
#2	838.25	43.34	6.06	-8.36	41.04	MaxQP	Vertical	152	156	46.0	-5.0	Pass
#3	850.26	46.31	6.11	-8.30	44.12	MaxQP	Vertical	203	204	46.0	-1.9	Pass
#4	865.18	39.27	6.13	-8.03	37.37	MaxQP	Vertical	152	187	46.0	-8.6	Pass
#5	902.27	46.13	6.24	-8.00	44.37	Fundamental	Horizontal	100	0	--	--	
#6	954.34	42.48	6.37	-7.27	41.58	MaxQP	Vertical	152	245	46.0	-4.4	Pass
Test Notes: EUT powered by 4V DC. 900 MHz notch in front of amp to prevent overload.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	915.20	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	837.21	43.37	6.05	-8.56	40.86	MaxQP	Vertical	129	238	46.0	-5.1	Pass
#2	851.19	44.16	6.12	-8.29	41.99	MaxQP	Vertical	186	202	46.0	-4.0	Pass
#3	863.18	45.73	6.13	-8.14	43.72	MaxQP	Vertical	134	187	46.0	-2.3	Pass
#4	915.15	42.27	6.25	-7.82	40.70	Fundamental	Horizontal	100	0	--	--	
#5	956.65	37.06	6.38	-7.17	36.27	MaxQP	Vertical	121	10	46.0	-9.7	Pass
Test Notes: EUT powered by 4V DC. 900 MHz notch in front of amp to prevent overload.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.90	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	848.89	43.76	6.10	-8.13	41.73	MaxQP	Vertical	161	150	46.0	-4.3	Pass
#2	862.85	44.48	6.14	-8.15	42.47	MaxQP	Vertical	142	192	46.0	-3.5	Pass
#3	926.92	74.07	6.28	-7.64	72.71	Fundamental	Vertical	100	0	--	--	
#4	952.86	39.58	6.37	-7.26	38.69	MaxQP	Vertical	159	4	46.0	-7.3	Pass
#5	958.88	38.63	6.39	-7.28	37.74	MaxQP	Vertical	171	1	46.0	-8.3	Pass
Test Notes: EUT powered by 4V DC.. 900 MHz notch in front of amp to prevent overload.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	Hopping	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	855.95	44.67	6.11	-8.23	42.55	Peak (NRB)	Vertical	100	0	--	--	Pass
#2	903.55	46.83	6.23	-7.81	45.25	Fundamental	Vertical	100	0	--	--	Pass
#3	926.37	73.58	6.28	-7.64	72.22	Fundamental	Vertical	100	0	--	--	Pass
#4	958.78	44.07	6.39	-7.28	43.18	Peak (NRB)	Vertical	100	0	--	--	Pass
Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload. WP WPANT30017-CA Antenna												

Note: click the links in the above matrix to view the graphical image (plot).

1-10 GHz

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.0	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	902.30	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	2706.89	55.89	2.35	-11.97	46.27	Max Peak	Horizontal	118	125	74.0	-27.7	Pass
#2	2706.89	51.72	2.35	-11.97	42.10	Max Avg	Horizontal	118	125	54.0	-11.9	Pass
#3	4511.45	55.35	2.89	-12.00	46.24	Max Peak	Horizontal	103	109	74.0	-27.8	Pass
#4	4511.45	48.53	2.89	-12.00	39.42	Max Avg	Horizontal	103	109	54.0	-14.6	Pass
#5	6315.94	58.60	3.27	-9.11	52.76	Peak (NRB)	Vertical	100	0	--	--	Pass
#6	7218.40	51.72	3.48	-7.38	47.82	Peak (NRB)	Vertical	100	0	--	--	Pass
Test Notes: EUT powered by 4 volt DC												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.0	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	915.20	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	2745.52	57.15	2.39	-11.96	47.58	Max Peak	Horizontal	136	129	74.0	-26.4	Pass
#2	2745.52	52.79	2.39	-11.96	43.22	Max Avg	Horizontal	136	129	54.0	-10.8	Pass
#3	4576.17	55.36	2.93	-12.01	46.28	Max Peak	Horizontal	120	83	74.0	-27.7	Pass
#4	4576.17	47.39	2.93	-12.01	38.31	Max Avg	Horizontal	120	83	54.0	-15.7	Pass
#5	6406.00	53.38	3.18	-9.21	47.35	Peak (NRB)	Vertical	100	0	--	--	Pass
#6	7321.70	55.15	3.50	-7.87	50.78	Max Peak	Vertical	176	156	74.0	-23.2	Pass
#7	7321.70	49.13	3.50	-7.87	44.76	Max Avg	Vertical	176	156	54.0	-9.2	Pass
#8	8236.63	53.32	3.96	-7.29	49.99	Max Peak	Vertical	174	69	74.0	-24.0	Pass
#9	8236.63	45.91	3.96	-7.29	42.58	Max Avg	Vertical	174	69	54.0	-11.4	Pass
Test Notes: EUT powered by 4 volt DC												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.90	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	1853.72	61.50	2.02	-13.81	49.71	Peak (NRB)	Vertical	100	169	--	--	Pass
#2	2780.70	53.77	2.40	-11.93	44.24	Max Peak	Vertical	195	132	74.0	-29.8	Pass
#3	2780.70	46.63	2.40	-11.93	37.10	Max Avg	Vertical	195	132	54.0	-16.9	Pass
#4	4634.56	59.43	2.93	-12.23	50.13	Max Peak	Vertical	156	320	74.0	-23.9	Pass
#5	4634.56	55.27	2.93	-12.23	45.97	Max Avg	Vertical	156	320	54.0	-8.0	Pass
#6	5561.54	63.35	3.16	-11.30	55.21	Peak (NRB)	Vertical	100	360	--	--	Pass
#7	6488.09	65.49	3.13	-8.96	59.66	Peak (NRB)	Vertical	100	0	--	--	Pass
#8	8342.35	53.38	3.99	-8.08	49.29	Max Peak	Horizontal	189	109	74.0	-24.7	Pass
#9	8342.35	44.14	3.99	-8.08	40.05	Max Avg	Horizontal	189	109	54.0	-14.0	Pass
Test Notes: EUT powered by 4 volt DC												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions			
Antenna:	WP WPANT30017-CA	**Variant:**	FHSS
Antenna Gain (dBi):	3.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	Hopping	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	2713.19	49.57	2.36	-12.03	39.90	Max Peak	Vertical	114	137	74.0	-34.1	Pass
#2	2713.19	35.66	2.36	-12.03	25.99	Max Avg	Vertical	114	137	54.0	-28.0	Pass
#3	2733.94	51.02	2.38	-12.05	41.35	Max Peak	Vertical	144	279	74.0	-32.7	Pass
#4	2733.94	35.72	2.38	-12.05	26.05	Max Avg	Vertical	144	279	54.0	-28.0	Pass
#5	2779.94	48.69	2.40	-11.96	39.13	Max Peak	Vertical	137	6	74.0	-34.9	Pass
#6	2779.94	35.29	2.40	-11.96	25.73	Max Avg	Vertical	137	6	54.0	-28.3	Pass
#7	6408.71	63.15	3.17	-9.22	57.10	Peak (NRB)	Vertical	151	7	--	--	Pass
#8	6446.36	63.05	3.15	-9.04	57.16	Peak (NRB)	Vertical	151	7	--	--	Pass
#9	8317.67	54.00	3.98	-7.89	50.09	Max Peak	Horizontal	158	228	74.0	-23.9	Pass
#10	8317.67	36.93	3.98	-7.89	33.02	Max Avg	Horizontal	158	228	54.0	-21.0	Pass
Test Notes: EUT powered by 4V DC. Hopping												

Note: click the links in the above matrix to view the graphical image (plot).

Wrap Antenna (WPANT40020-SA)

30-1000 MHz

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT40020-SA	**Variant:**	FHSS
Antenna Gain (dBi):	1.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	902.30	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	850.33	38.64	6.11	-8.30	36.45	MaxQP	Horizontal	192	154	46.0	-9.6	Pass
#2	863.13	35.29	6.13	-8.14	33.28	MaxQP	Horizontal	200	209	46.0	-12.7	Pass
#3	902.31	41.57	6.24	-8.00	39.81	Fundamental	Horizontal	100	181	--	--	
#4	954.29	43.13	6.37	-7.27	42.23	MaxQP	Horizontal	163	191	46.0	-3.8	Pass
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT40020-SA	**Variant:**	FHSS
Antenna Gain (dBi):	1.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	915.20	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	863.20	44.68	6.13	-8.14	42.67	MaxQP	Horizontal	201	167	46.0	-3.3	Pass
#2	915.15	41.60	6.25	-7.82	40.03	Fundamental	Horizontal	100	189	--	--	
#3	952.66	40.44	6.37	-7.26	39.55	MaxQP	Horizontal	105	194	46.0	-6.5	Pass
#4	957.73	41.35	6.38	-7.08	40.65	MaxQP	Horizontal	168	174	46.0	-5.4	Pass
#5	967.21	46.77	6.44	-7.27	45.94	MaxQP	Horizontal	154	189	53.0	-7.1	Pass
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions

Antenna:	WP WPANT40020-SA	**Variant:**	FHSS
Antenna Gain (dBi):	1.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.90	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	848.92	41.75	6.10	-8.13	39.72	MaxQP	Horizontal	127	191	46.0	-6.3	Pass
#2	862.87	45.49	6.14	-8.15	43.48	MaxQP	Horizontal	123	199	46.0	-2.5	Pass
#3	874.92	33.86	6.17	-7.99	32.04	MaxQP	Vertical	272	230	46.0	-14.0	Pass
#4	926.92	63.08	6.28	-7.64	61.72	Fundamental	Horizontal	100	0	--	--	
#5	952.88	46.15	6.37	-7.26	45.26	MaxQP	Horizontal	110	179	46.0	-0.7	Pass
#6	958.89	45.17	6.39	-7.28	44.28	MaxQP	Horizontal	224	202	46.0	-1.7	Pass
#7	978.88	46.37	6.46	-6.89	45.94	MaxQP	Horizontal	221	200	53.0	-7.1	Pass
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Radiated Spurious Emissions			
Antenna:	WP WPANT40020-SA	**Variant:**	FHSS
Antenna Gain (dBi):	1.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	Hopping	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	869.23	43.17	6.16	-8.10	41.23	Peak (NRB)	Horizontal	100	10	--	--	Pass
#2	926.92	62.99	6.28	-7.64	61.63	Fundamental	Horizontal	100	0	--	--	Pass
#3	958.85	46.07	6.39	-7.28	45.18	Peak (NRB)	Horizontal	100	164	--	--	Pass
Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload. WP WPANT40020-SA antenna												

Note: click the links in the above matrix to view the graphical image (plot).

1-10 GHz

Equipment Configuration for TX Spurious & Restricted Band Emissions			
Antenna:	Not Applicable	**Variant:**	FHSS
Antenna Gain (dBi):	Not Applicable	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	902.30	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	1804.54	66.25	2.03	-14.44	53.84	Peak (NRB)	Horizontal	100	158	--	--	Pass
#2	2707.00	54.20	2.35	-11.97	44.58	Max Peak	Vertical	102	100	74.0	-29.4	Pass
#3	2707.00	48.35	2.35	-11.97	38.73	Max Avg	Vertical	102	100	54.0	-15.3	Pass
#4	4511.46	56.38	2.89	-12.00	47.27	Max Peak	Horizontal	141	144	74.0	-26.7	Pass
#5	4511.46	51.35	2.89	-12.00	42.24	Max Avg	Horizontal	141	144	54.0	-11.8	Pass
#6	6316.07	65.51	3.27	-9.12	59.66	Peak (NRB)	Vertical	100	158	--	--	Pass
#7	8120.56	53.48	4.04	-7.69	49.83	Max Peak	Vertical	187	139	74.0	-24.2	Pass
#8	8120.56	46.77	4.04	-7.69	43.12	Max Avg	Vertical	187	139	54.0	-10.9	Pass
Test Notes: EUT powered by 4 volt DC, Ext wrap antenna. meter internals replaced antenna moved to 12 o'clock												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WPANT40010-C	**Variant:**	FHSS
Antenna Gain (dBi):	1.0	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	915.20	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	1830.38	61.62	2.03	-14.03	49.62	Peak (NRB)	Horizontal	100	21	--	--	Pass
#2	2745.63	60.07	2.39	-11.96	50.50	Max Peak	Vertical	131	188	74.0	-23.5	Pass
#3	2745.63	57.33	2.39	-11.96	47.76	Max Avg	Vertical	131	188	54.0	-6.2	Pass
#4	4576.05	59.06	2.93	-12.01	49.98	Max Peak	Horizontal	102	157	74.0	-24.0	Pass
#5	4576.05	55.11	2.93	-12.01	46.03	Max Avg	Horizontal	102	157	54.0	-8.0	Pass
#6	6406.60	59.58	3.18	-9.21	53.55	Peak (NRB)	Vertical	100	0	--	--	Pass
#7	8236.91	55.67	3.96	-7.29	52.34	Max Peak	Horizontal	148	29	74.0	-21.7	Pass
#8	8236.91	49.99	3.96	-7.29	46.66	Max Avg	Horizontal	148	29	54.0	-7.3	Pass
Test Notes: EUT powered by 4 volt DC, Ext wrap antenna. meter internals replaced antenna moved to 12 o'clock												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WPANT40020-SA	**Variant:**	FHSS
Antenna Gain (dBi):	1.0	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.90	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	1853.70	71.11	2.02	-13.81	59.32	Peak (NRB)	Horizontal	100	153	--	--	Pass
#2	2780.67	62.87	2.40	-11.93	53.34	Max Peak	Horizontal	100	141	74.0	-20.7	Pass
#3	2780.67	60.97	2.40	-11.93	51.44	Max Avg	Horizontal	100	141	54.0	-2.6	Pass
#4	4634.33	61.03	2.93	-12.23	51.73	Max Peak	Horizontal	100	150	74.0	-22.3	Pass
#5	4634.33	57.07	2.93	-12.23	47.77	Max Avg	Horizontal	100	150	54.0	-6.2	Pass
#6	5561.24	56.48	3.16	-11.30	48.34	Peak (NRB)	Vertical	100	153	--	--	Pass
#7	6488.05	63.70	3.13	-8.96	57.87	Peak (NRB)	Vertical	100	86	--	--	Pass
#8	7415.39	53.51	3.54	-7.93	49.12	Max Peak	Vertical	146	131	74.0	-24.9	Pass
#9	7415.39	45.93	3.54	-7.93	41.54	Max Avg	Vertical	146	131	54.0	-12.5	Pass
#10	8342.02	51.99	3.99	-8.08	47.90	Max Peak	Horizontal	108	43	74.0	-26.1	Pass
#11	8342.02	42.77	3.99	-8.08	38.68	Max Avg	Horizontal	108	43	54.0	-15.3	Pass
Test Notes: EUT powered by 4 volt DC,												

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Restricted Band Emissions

Antenna:	WP WPANT40020-SA	**Variant:**	FHSS
Antenna Gain (dBi):	1.00	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	Hopping	**Data Rate:**	100 KBit/s
Power Setting:	28	**Tested By:**	JMH

Test Measurement Results

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	1845.99	70.17	2.03	-13.89	58.31	Peak (NRB)	Horizontal	151	160	--	--	Pass
#2	2777.06	55.69	2.40	-12.02	46.07	Max Peak	Vertical	175	152	74.0	-27.9	Pass
#3	2777.06	38.22	2.40	-12.02	28.60	Max Avg	Vertical	175	152	54.0	-25.4	Pass
#4	4591.04	58.10	2.91	-12.01	49.00	Max Peak	Horizontal	118	128	74.0	-25.0	Pass
#5	4591.04	40.19	2.91	-12.01	31.09	Max Avg	Horizontal	118	128	54.0	-22.9	Pass
#6	6332.89	62.76	3.23	-9.29	56.70	Peak (NRB)	Vertical	151	160	--	--	Pass
#7	6469.57	61.98	3.18	-9.06	56.10	Peak (NRB)	Vertical	151	160	--	--	Pass
#8	8276.97	52.48	3.98	-7.67	48.79	Max Peak	Vertical	178	46	74.0	-25.2	Pass
#9	8276.97	35.54	3.98	-7.67	31.85	Max Avg	Vertical	178	46	54.0	-22.2	Pass
Test Notes: EUT powered by 4V DC. Hopping												

Note: click the links in the above matrix to view the graphical image (plot).

9.4.3. Digital Emissions (0.03 - 1 GHz)

Radiated Test Conditions for Radiated Digital and Receiver Emissions (0.03 – 10 GHz)			
Rules and Sections:	FCC CFR 47:15.209, ICES-003: 6.2 RSS-GEN: 7	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Digital Emissions,	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	ANSI C63.4: 8.3	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Digital Emissions and Receiver Emissions (0.03 – 10 GHz)

Testing 30 – 10,000 MHz was performed in an anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.

Test configuration and setup for Radiated Digital and Receiver Emissions Measurement were per the Radiated Test Set-up specified in this document.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

FS = R + AF + CORR

where:
FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBmV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3dBmV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are done as:

Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100mV/m
48 dBmV/m = 250mV/m

Limits for Radiated Digital Emissions (0.03 – 10 GHz)

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength		Measurement Distance (m)
	µV/m (microvolts/meter)	dBµV/m (dB microvolts/meter)	
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F(kHz)	--	30
1.705-30.0	30	29.5	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46.0	3
Above 960	500	54.0	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241. (b) In the emission table above, the tighter limit applies at the band edges. (c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. (e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part. (f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device. (g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

Integral Antenna (Tai Sheng Chen 155-0010-00)

USB Not Active

Equipment Configuration for Radiated Digital Emissions			
Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	1.20	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	Not Applicable
Channel Frequency (MHz):	915.2	**Data Rate:**	Not Applicable
Power Setting:	NA	**Tested By:**	JMH

Test Measurement Results
Click here to view measurement data...
Test Notes: EUT powered by 4V DC. Receiver Emissions

USB Active and Downloading, Connected to SBC Computer

Equipment Configuration for Radiated Digital Emissions

Antenna:	WP WPANT30017-CA	**Variant:**	OFDM
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	Not Applicable
Channel Frequency (MHz):	915.2	**Data Rate:**	Not Applicable
Power Setting:	NA	**Tested By:**	JMH

Test Measurement Results

30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
#1	39.02	43.91	3.47	-17.37	30.01	MaxQP	Vertical	104	71	40.0	-10.0	Pass
#2	431.96	49.59	4.99	-14.31	40.27	MaxQP	Horizontal	204	154	46.0	-5.7	Pass
#3	443.99	49.98	5.02	-14.21	40.79	MaxQP	Horizontal	101	356	46.0	-5.2	Pass
#4	456.01	50.18	5.04	-13.93	41.29	MaxQP	Horizontal	282	349	46.0	-4.7	Pass
#5	468.02	47.67	5.07	-13.37	39.37	MaxQP	Horizontal	101	301	46.0	-6.6	Pass
#6	503.99	48.65	5.20	-13.23	40.62	MaxQP	Horizontal	159	160	46.0	-5.4	Pass

Test Notes: Powered by AC/DC PS. Digital Communications over USB. Connected to SBC.

Equipment Configuration for Restricted Band Spurious Emissions			
Antenna:	Tai Sheng Chen 155-0010-00	**Variant:**	FHSS
Antenna Gain (dBi):	Not Applicable	**Modulation:**	FSK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	Not Applicable
Channel Frequency (MHz):	915.2	**Data Rate:**	Not Applicable
Power Setting:	NA	**Tested By:**	JMH

Test Measurement Results
Click here to view measurement data...
Test Notes: EUT powered by 4 volt DC, Receiver Emissions

9.4.4. AC Wireline Emissions

Test Conditions for ac Wireline Emissions (0.15 – 30 MHz)			
Rules and Sections:	FCC CFR 47:15.207 ICES-003:6.1	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Conducted (ac Wireline Emissions)	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	ANSI C63.4: 7.3	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for ac Wireline Emissions (0.15 – 30 MHz)
The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test configuration and setup for ac Wireline Emission Measurement were per the ac Wireline Test Set-up specified in this document.

Limits for ac Wireline Emissions

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBmV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

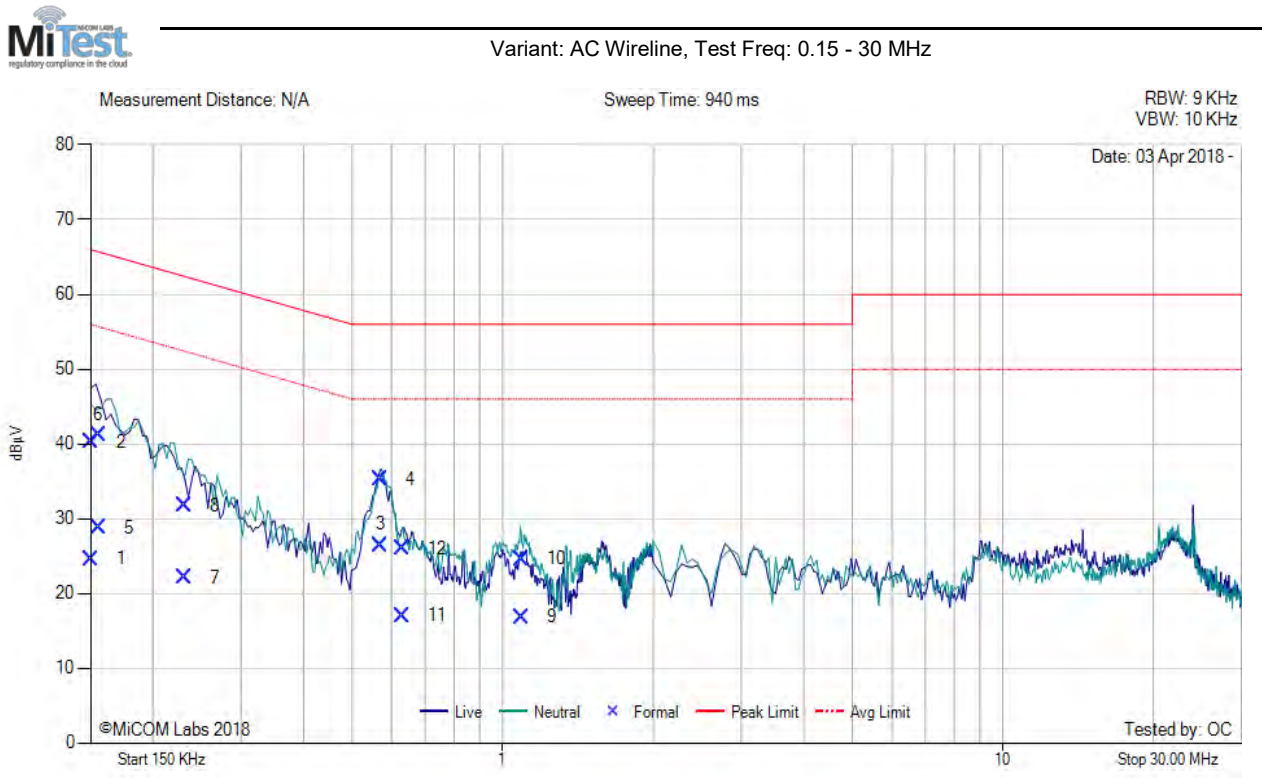
(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

Measurement Results

Model:	NIC-510-06	Configuration tested:	AC/DC POWERED
Input power:	120V_{AC}/60Hz	Standard:	FCC 15B



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	0.150	14.64	0.05	9.92	9.97	24.61	Max Avg	Live	56.0	-31.4	Pass
2	0.150	30.27	0.05	9.92	9.97	40.24	Max Qp	Live	66.0	-25.8	Pass
3	0.570	16.43	0.10	9.92	10.02	26.45	Max Avg	Live	46.0	-19.6	Pass
4	0.570	25.29	0.10	9.92	10.02	35.31	Max Qp	Live	56.0	-20.7	Pass
5	0.156	18.81	0.05	9.92	9.97	28.78	Max Avg	Neutral	55.8	-27.1	Pass
6	0.156	31.21	0.05	9.92	9.97	41.18	Max Qp	Neutral	65.8	-24.7	Pass
7	0.231	12.13	0.07	9.92	9.99	22.12	Max Avg	Live	53.7	-31.6	Pass
8	0.231	21.76	0.07	9.92	9.99	31.75	Max Qp	Live	63.7	-31.9	Pass
9	1.091	6.83	0.08	9.94	10.02	16.85	Max Avg	Neutral	46.0	-29.2	Pass
10	1.091	14.61	0.08	9.94	10.02	24.63	Max Qp	Neutral	56.0	-31.4	Pass
11	0.631	6.98	0.11	9.93	10.04	17.02	Max Avg	Neutral	46.0	-29.0	Pass
12	0.631	15.94	0.11	9.93	10.04	25.98	Max Qp	Neutral	56.0	-30.0	Pass

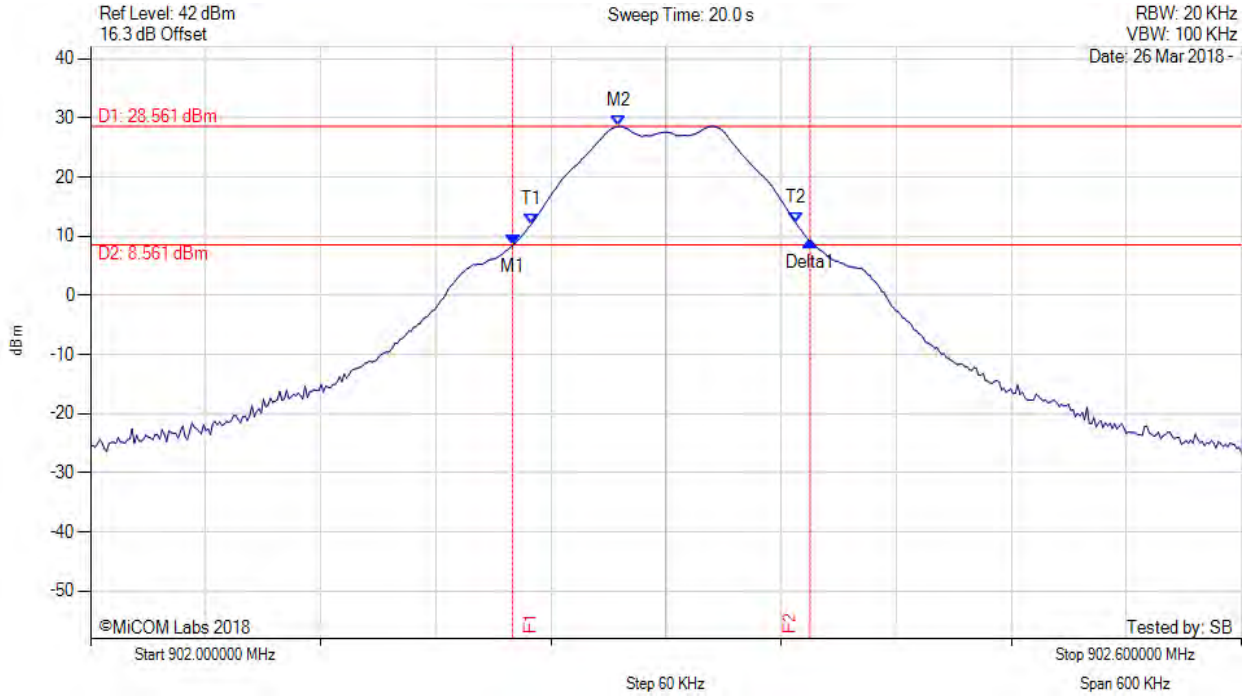
Test Notes: Model: NIC 510-06. AC/DC powered at 120Vac, 60Hz.

A. APPENDIX - GRAPHICAL IMAGES

A.1. 20 dB & 99% Bandwidth

20 dB 99% BANDWIDTH

Variant: 100.00 KBit/s, Channel: 902.30 MHz, Chain a, Temp: 20, Voltage: Vdc

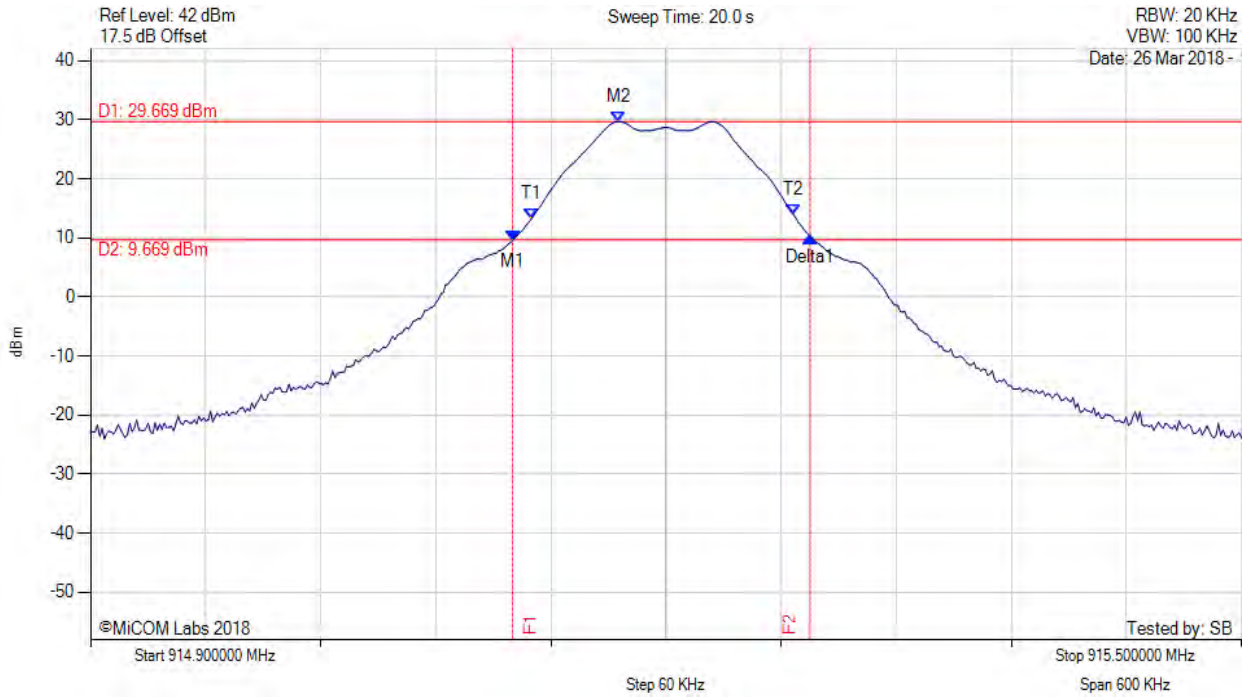


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.220 MHz : 8.388 dBm M2 : 902.275 MHz : 28.561 dBm Delta1 : 155 KHz : 0.793 dB T1 : 902.230 MHz : 11.947 dBm T2 : 902.368 MHz : 12.140 dBm OBW : 138 KHz	Measured 20 dB Bandwidth: 0.155 MHz Limit: 0.5 kHz Margin: 0.34 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 100.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

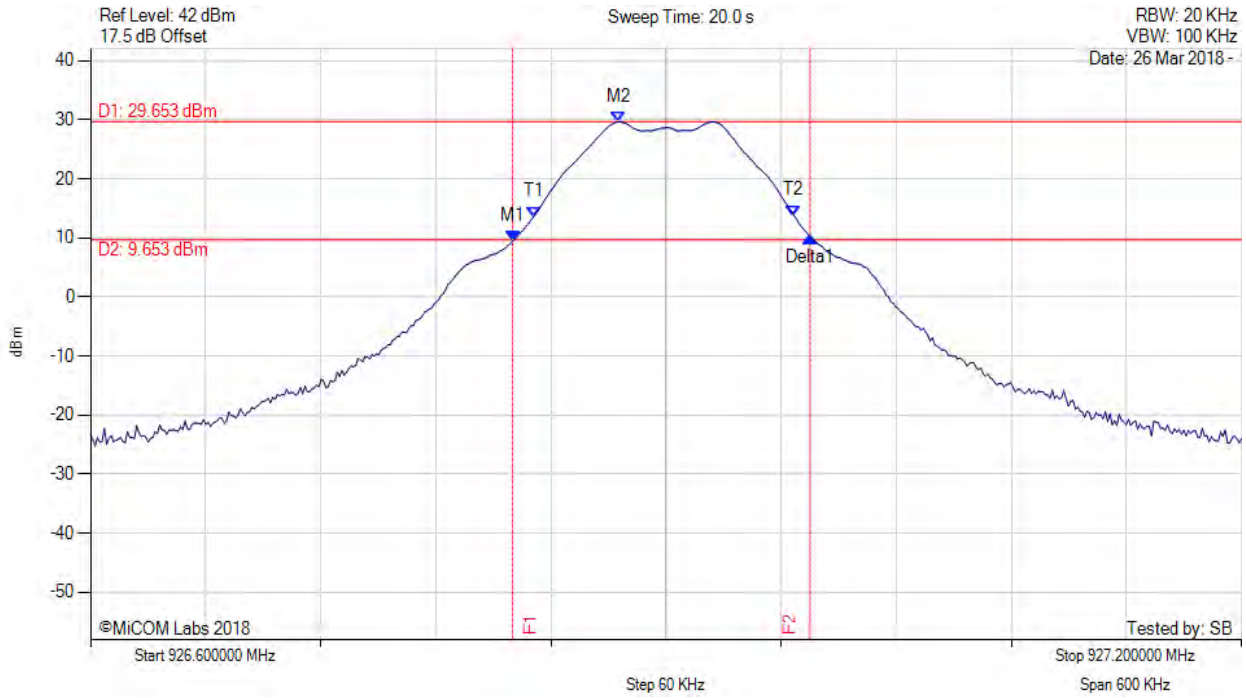


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 915.120 MHz : 9.545 dBm M2 : 915.175 MHz : 29.669 dBm Delta1 : 155 KHz : 0.655 dB T1 : 915.130 MHz : 13.137 dBm T2 : 915.267 MHz : 13.831 dBm OBW : 137 KHz	Measured 20 dB Bandwidth: 0.155 MHz Limit: 0.5 kHz Margin: 0.34 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 100.00 KBit/s, Channel: 926.90 MHz, Chain a, Temp: 20, Voltage: Vdc

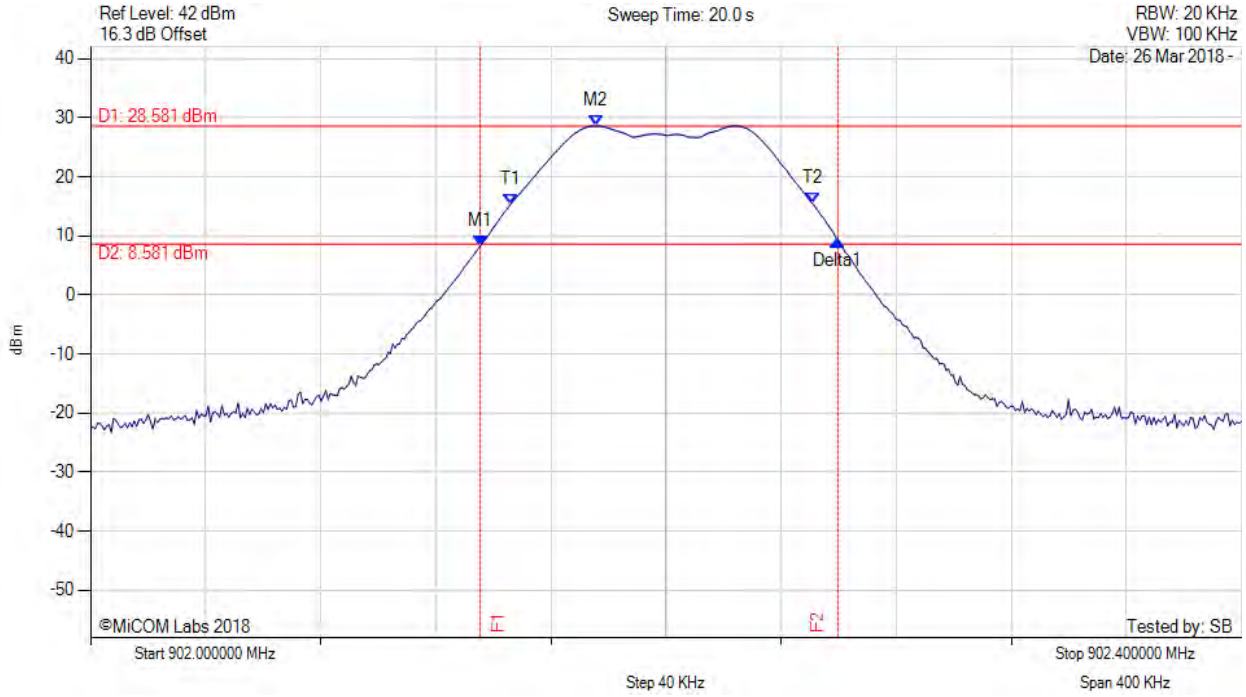


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 926.820 MHz : 9.446 dBm M2 : 926.875 MHz : 29.653 dBm Delta1 : 155 KHz : 0.765 dB T1 : 926.831 MHz : 13.523 dBm T2 : 926.967 MHz : 13.767 dBm OBW : 136 KHz	Measured 20 dB Bandwidth: 0.155 MHz Limit: 0.5 kHz Margin: 0.34 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 50.00 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

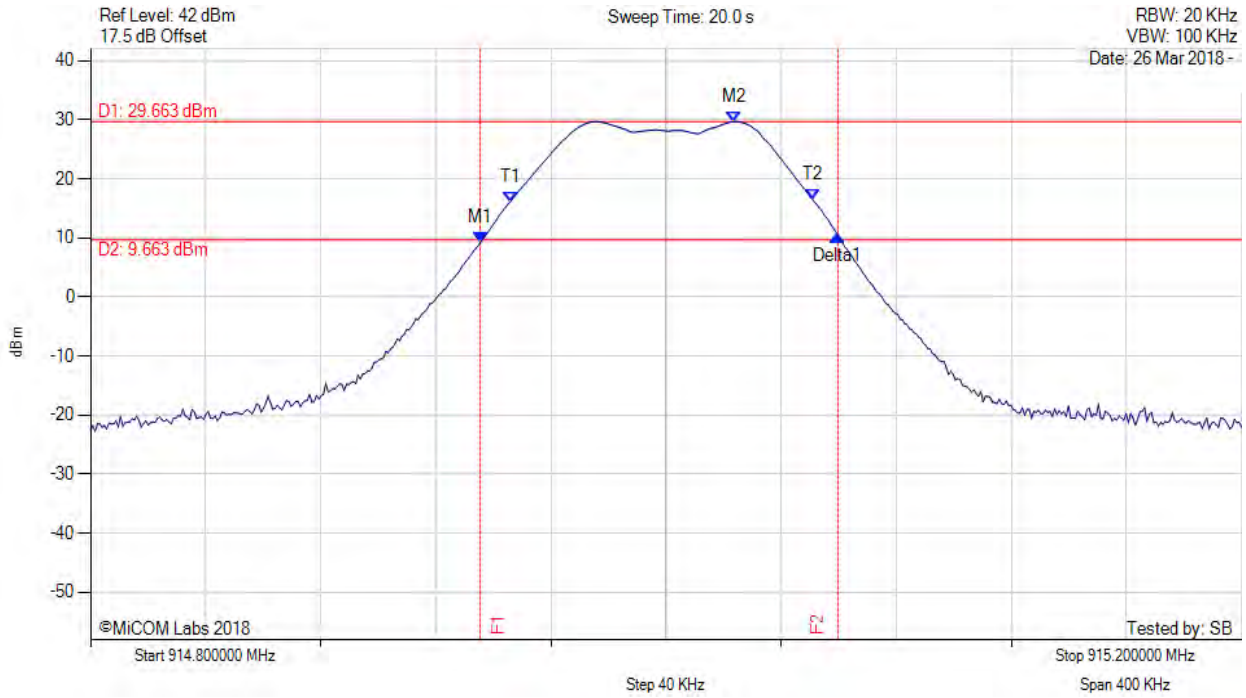


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.135 MHz : 8.299 dBm M2 : 902.176 MHz : 28.581 dBm Delta1 : 124 KHz : 0.992 dB T1 : 902.146 MHz : 15.266 dBm T2 : 902.251 MHz : 15.441 dBm OBW : 105 KHz	Measured 20 dB Bandwidth: 0.124 MHz Limit: 0.5 kHz Margin: 0.38 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

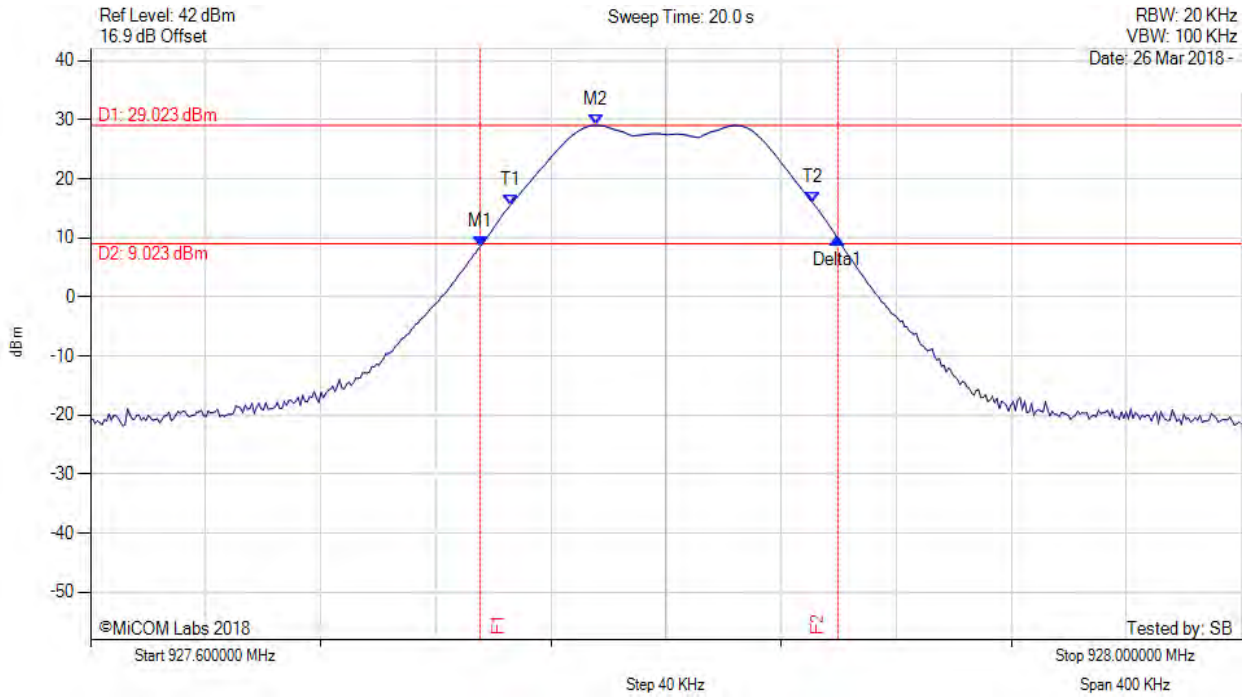


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 914.935 MHz : 9.228 dBm M2 : 915.024 MHz : 29.663 dBm Delta1 : 124 KHz : 1.204 dB T1 : 914.946 MHz : 16.086 dBm T2 : 915.051 MHz : 16.544 dBm OBW : 105 KHz	Measured 20 dB Bandwidth: 0.124 MHz Limit: 0.5 kHz Margin: 0.38 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 50.00 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc

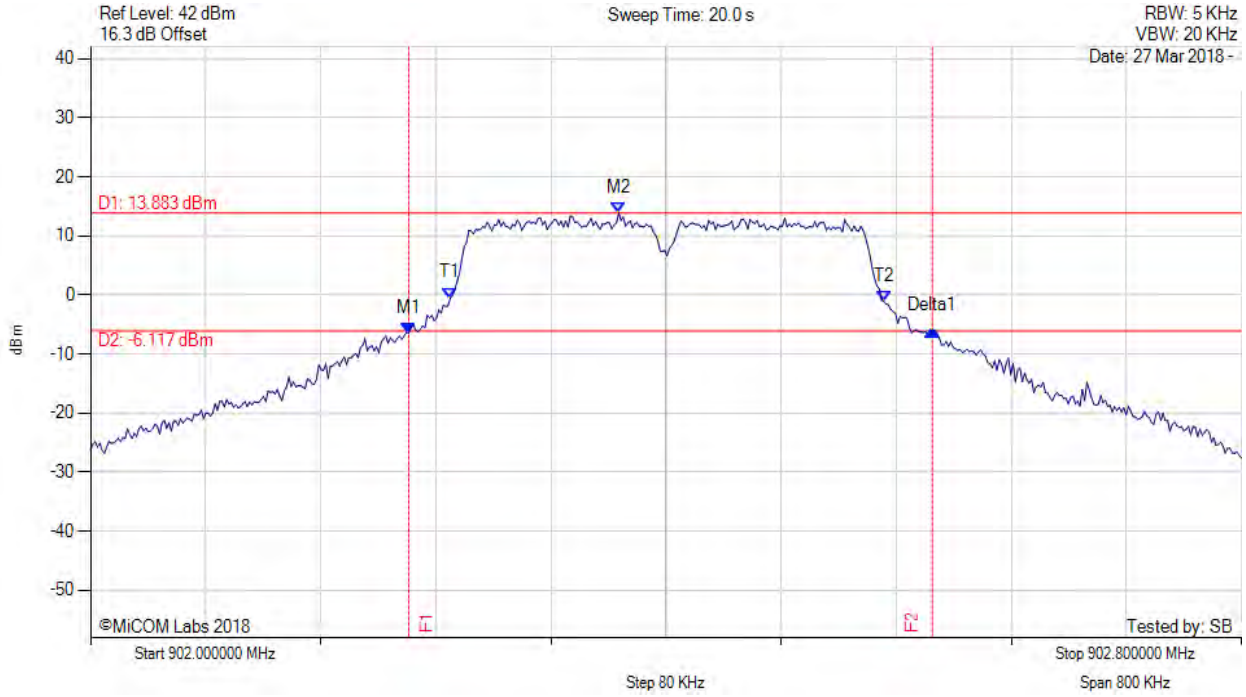


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.735 MHz : 8.486 dBm M2 : 927.776 MHz : 29.023 dBm Delta1 : 124 KHz : 1.413 dB T1 : 927.746 MHz : 15.555 dBm T2 : 927.851 MHz : 15.968 dBm OBW : 105 KHz	Measured 20 dB Bandwidth: 0.124 MHz Limit: 0.5 kHz Margin: 0.38 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 600.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

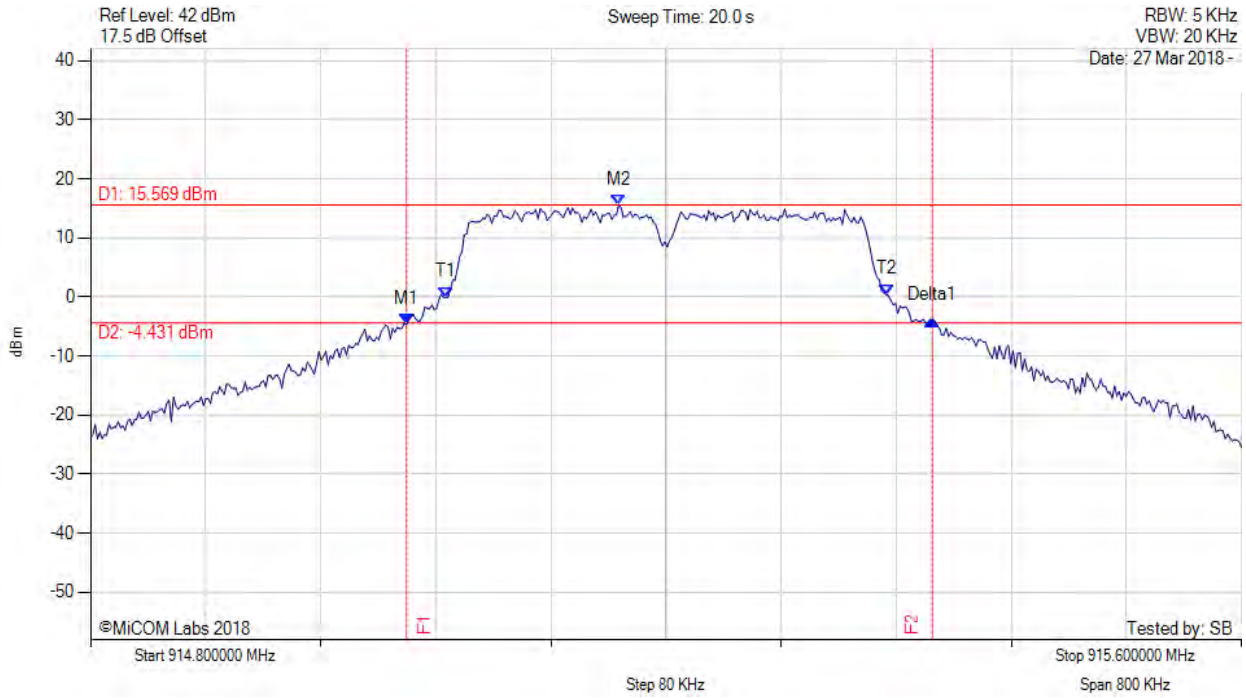


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.221 MHz : -6.460 dBm M2 : 902.367 MHz : 13.883 dBm Delta1 : 364 KHz : 0.405 dB T1 : 902.250 MHz : -0.540 dBm T2 : 902.552 MHz : -1.069 dBm OBW : 301 KHz	Measured 20 dB Bandwidth: 0.364 MHz Limit: 0.5 kHz Margin: 0.14 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 600.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

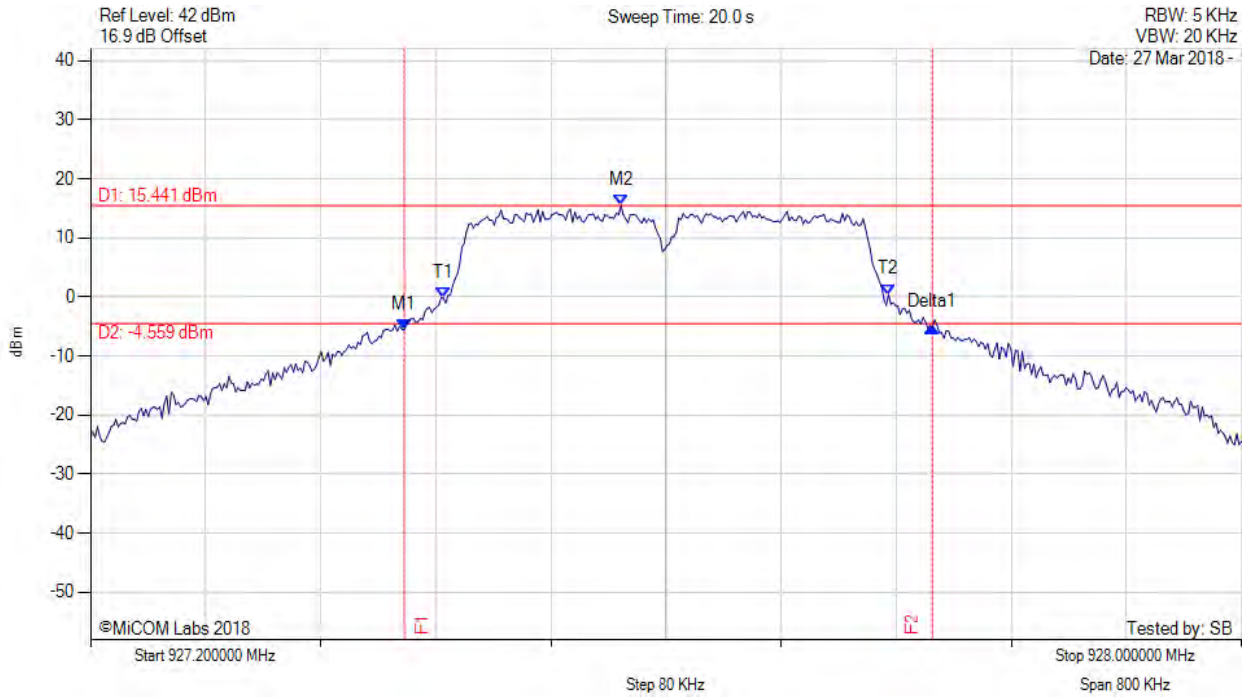


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 915.020 MHz : -4.681 dBm M2 : 915.167 MHz : 15.569 dBm Delta1 : 366 KHz : 0.663 dB T1 : 915.047 MHz : -0.054 dBm T2 : 915.353 MHz : 0.404 dBm OBW : 306 KHz	Measured 20 dB Bandwidth: 0.366 MHz Limit: 0.5 kHz Margin: 0.13 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: 600.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.418 MHz : -5.573 dBm M2 : 927.569 MHz : 15.441 dBm Delta1 : 367 KHz : 0.401 dB T1 : 927.445 MHz : -0.202 dBm T2 : 927.755 MHz : 0.412 dBm OBW : 309 KHz	Measured 20 dB Bandwidth: 0.367 MHz Limit: 0.5 kHz Margin: 0.13 MHz

back to matrix

20 dB 99% BANDWIDTH

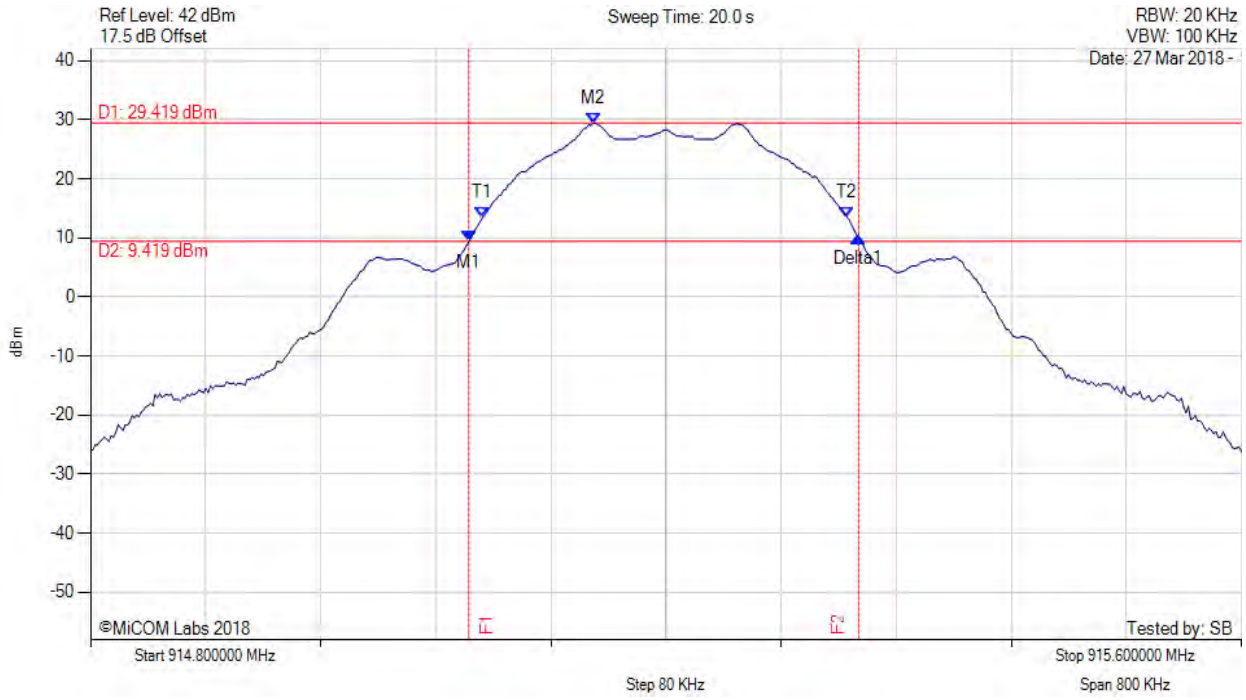
Variant: OQPSK 25.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.263 MHz : 8.154 dBm M2 : 902.349 MHz : 28.197 dBm Delta1 : 271 KHz : 0.736 dB T1 : 902.273 MHz : 11.939 dBm T2 : 902.526 MHz : 12.204 dBm OBW : 253 KHz	Measured 20 dB Bandwidth: 0.271 MHz Limit: 0.5 kHz Margin: 0.23 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

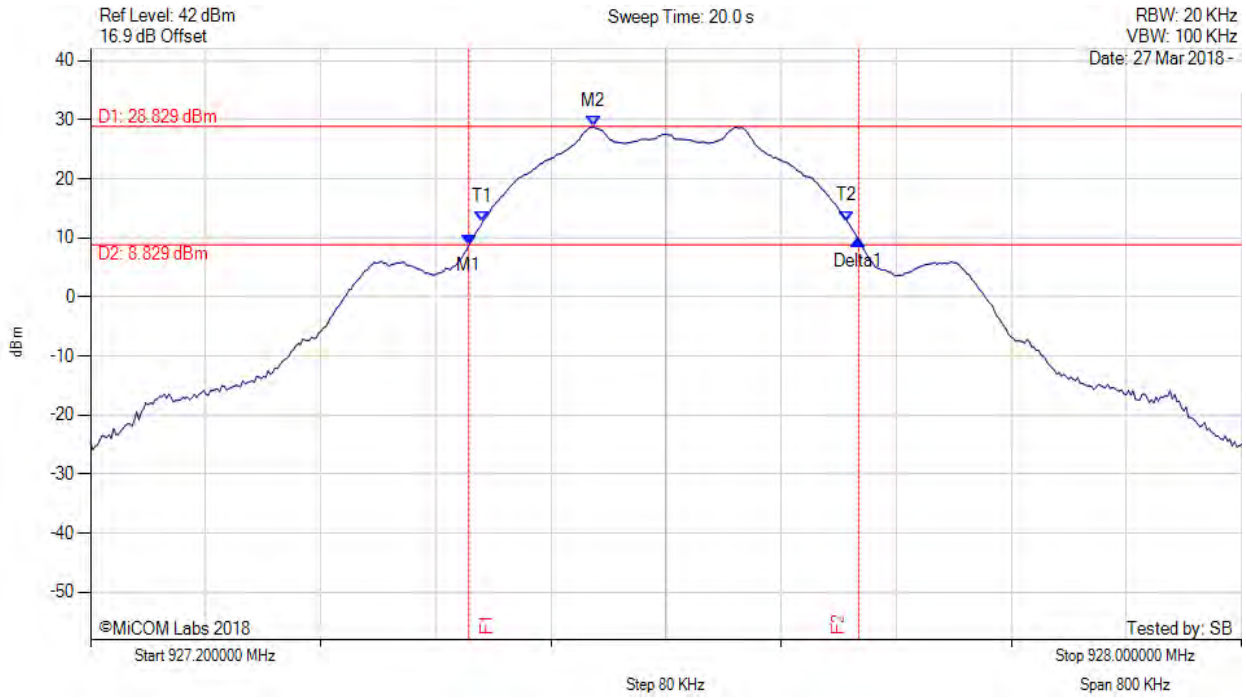


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 915.063 MHz : 9.326 dBm M2 : 915.149 MHz : 29.419 dBm Delta1 : 271 KHz : 0.793 dB T1 : 915.073 MHz : 13.473 dBm T2 : 915.326 MHz : 13.499 dBm OBW : 253 KHz	Measured 20 dB Bandwidth: 0.271 MHz Limit: 0.5 kHz Margin: 0.23 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: OQPSK 25.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

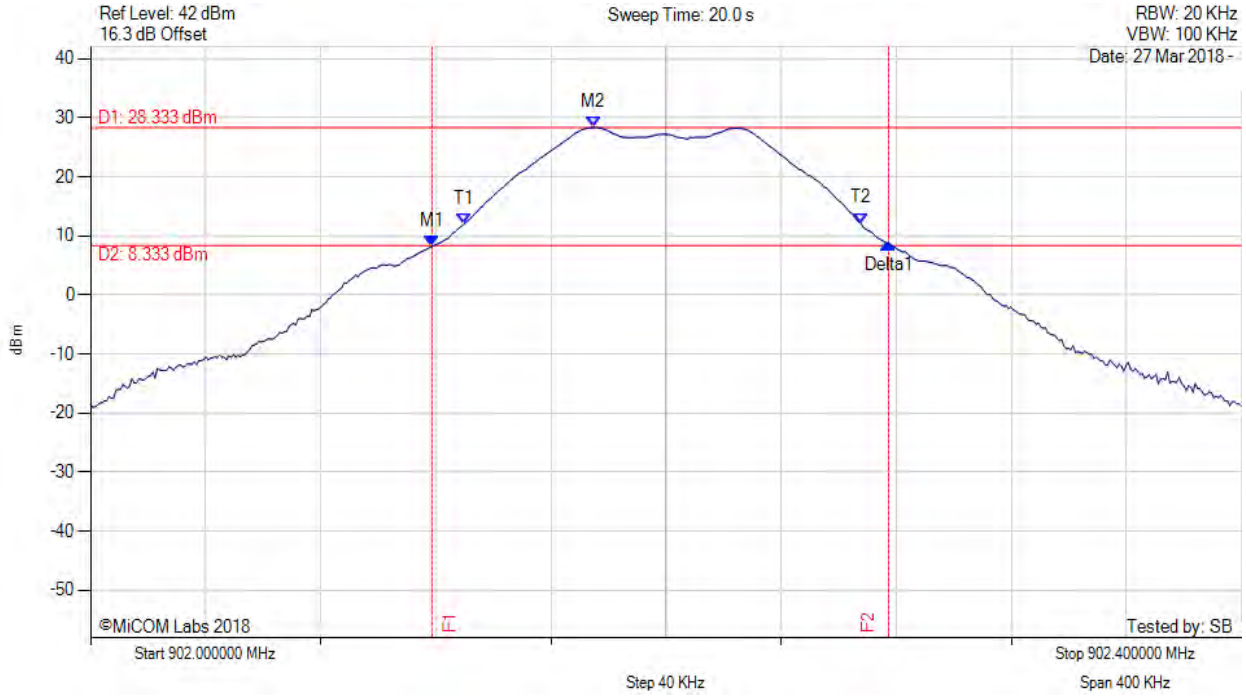


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.463 MHz : 8.781 dBm M2 : 927.549 MHz : 28.829 dBm Delta1 : 271 KHz : 0.783 dB T1 : 927.473 MHz : 12.789 dBm T2 : 927.726 MHz : 12.824 dBm OBW : 253 KHz	Measured 20 dB Bandwidth: 0.271 MHz Limit: 0.5 kHz Margin: 0.23 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: OQPSK 6.25 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

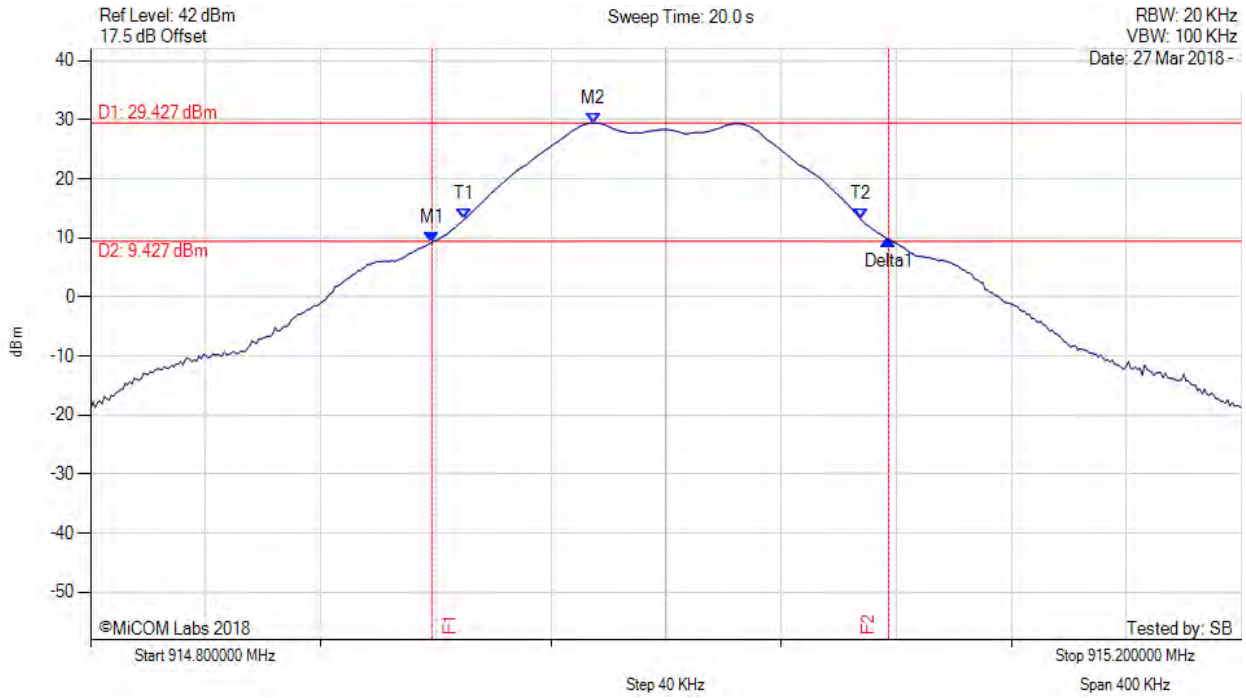


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.119 MHz : 8.205 dBm M2 : 902.175 MHz : 28.333 dBm Delta1 : 159 KHz : 0.488 dB T1 : 902.130 MHz : 11.996 dBm T2 : 902.268 MHz : 12.120 dBm OBW : 138 KHz	Measured 20 dB Bandwidth: 0.159 MHz Limit: 0.5 kHz Margin: 0.34 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

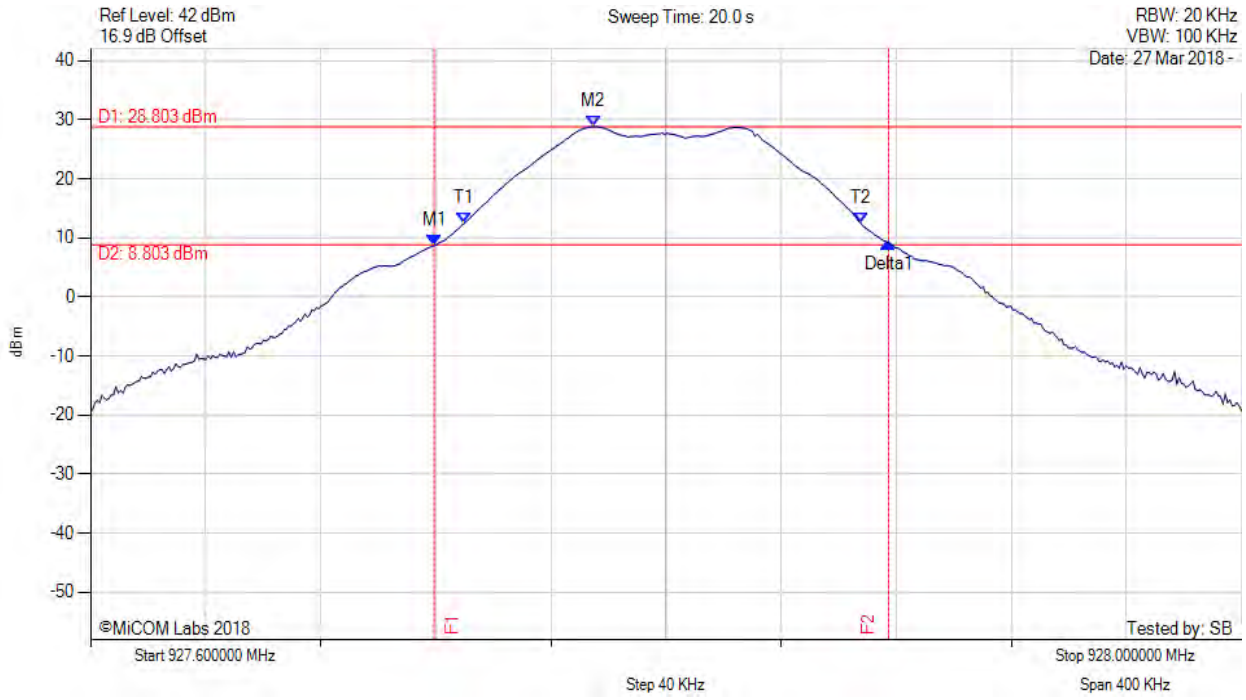


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 914.919 MHz : 9.210 dBm M2 : 914.975 MHz : 29.427 dBm Delta1 : 159 KHz : 0.374 dB T1 : 914.930 MHz : 13.119 dBm T2 : 915.068 MHz : 13.117 dBm OBW : 138 KHz	Measured 20 dB Bandwidth: 0.159 MHz Limit: 0.5 kHz Margin: 0.34 MHz

back to matrix

20 dB 99% BANDWIDTH

Variant: OQPSK 6.25 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.719 MHz : 8.657 dBm M2 : 927.775 MHz : 28.803 dBm Delta1 : 158 KHz : 0.500 dB T1 : 927.730 MHz : 12.427 dBm T2 : 927.868 MHz : 12.494 dBm OBW : 138 KHz	Measured 20 dB Bandwidth: 0.158 MHz Limit: 0.5 kHz Margin: 0.34 MHz

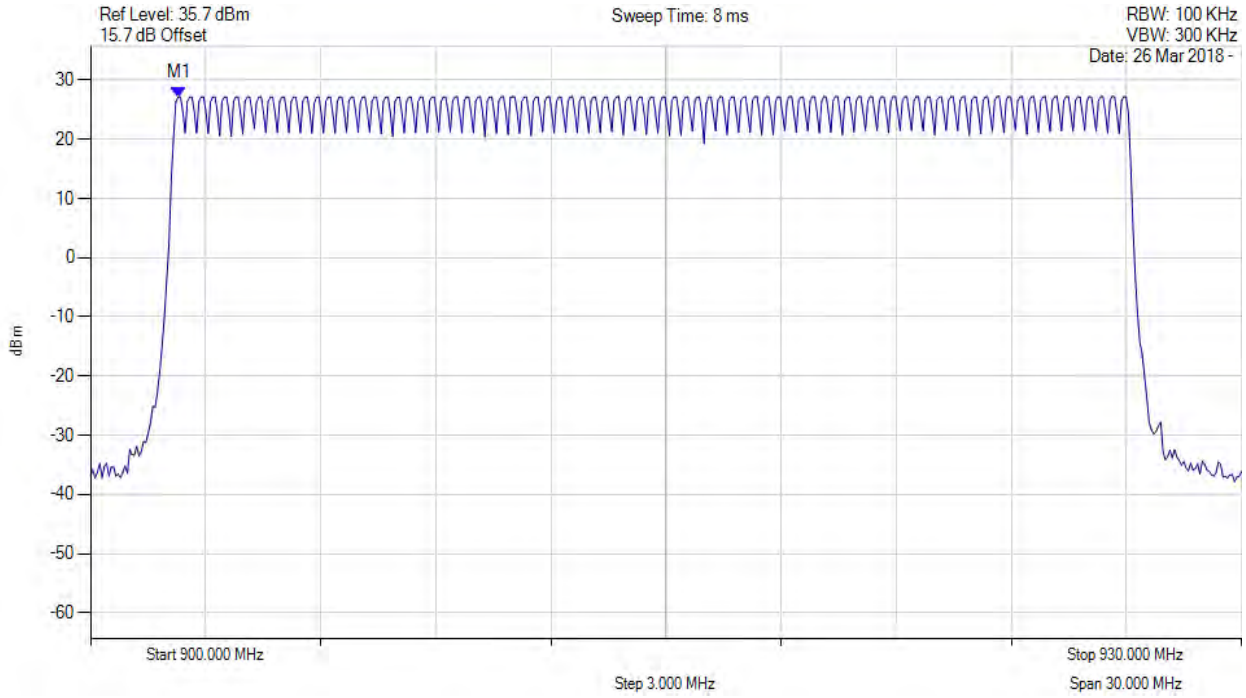
back to matrix

A.2. Frequency Hopping Tests

A.2.1. Number of Hopping Channels

NUMBER OF HOPPING CHANNELS

Variant: 100.00 KBit/s, Channel: 902.30 MHz, Chain a, Temp: 20, Voltage: 4 Vdc

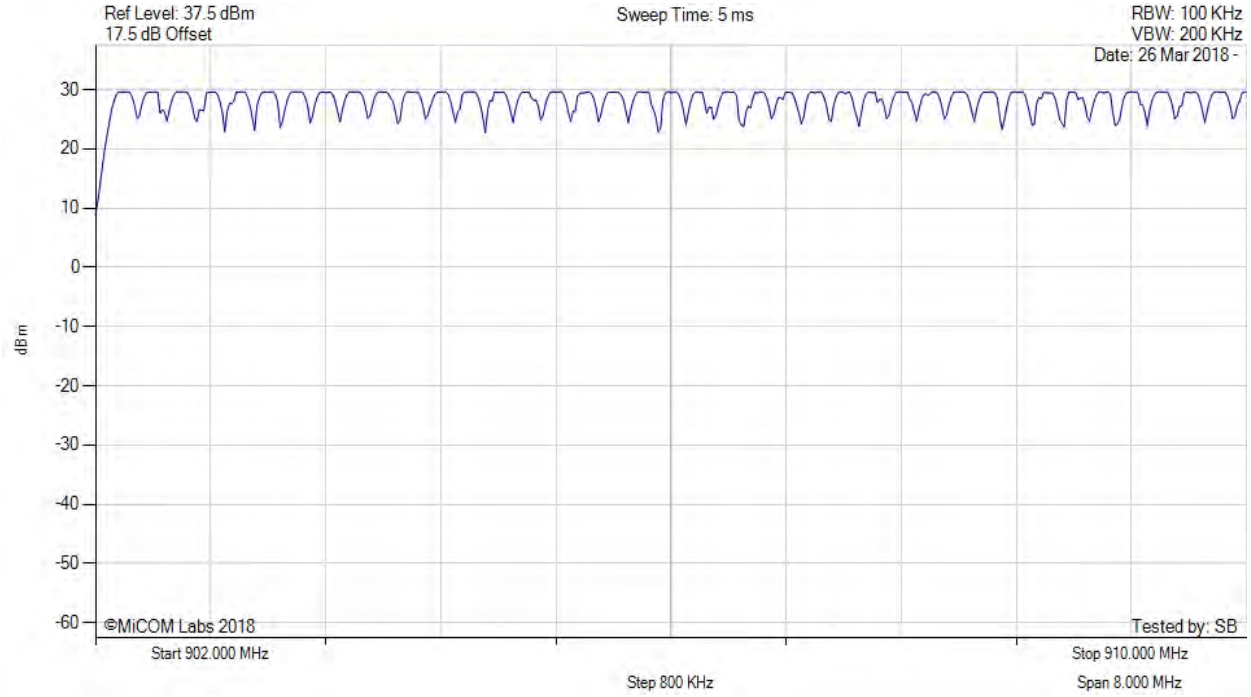


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.300 MHz : 27.114 dBm	Channel Frequency: 902.30 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

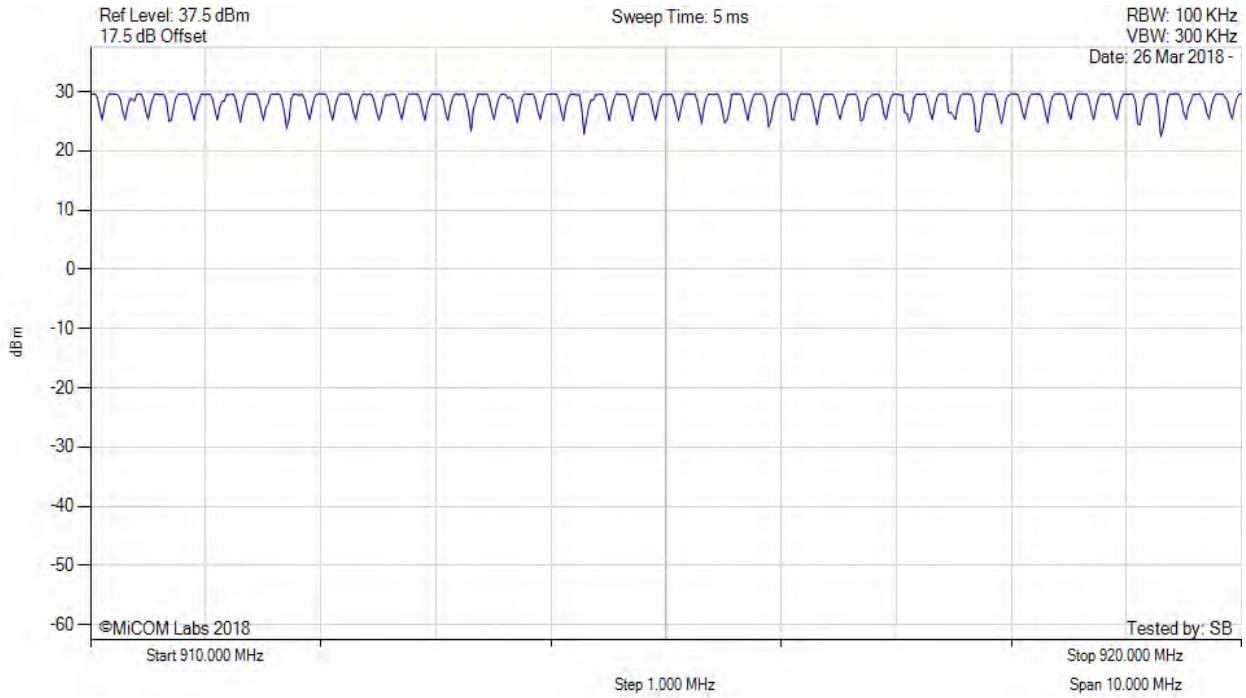


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.00 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

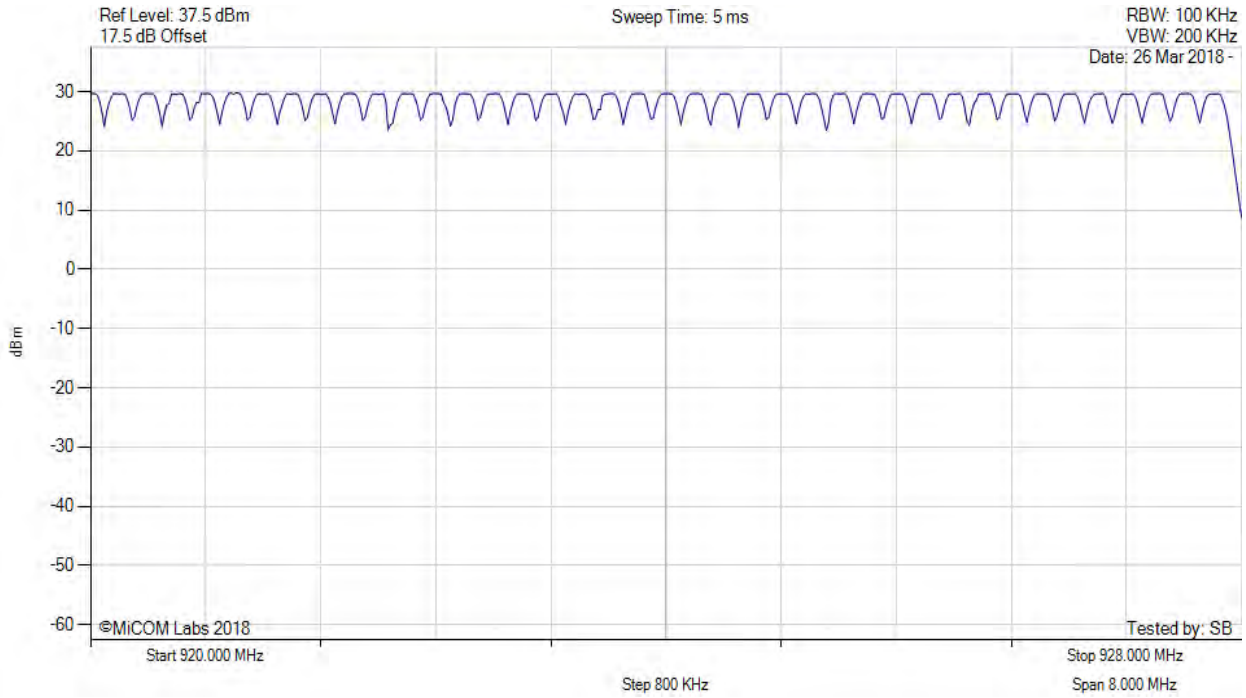


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.00 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

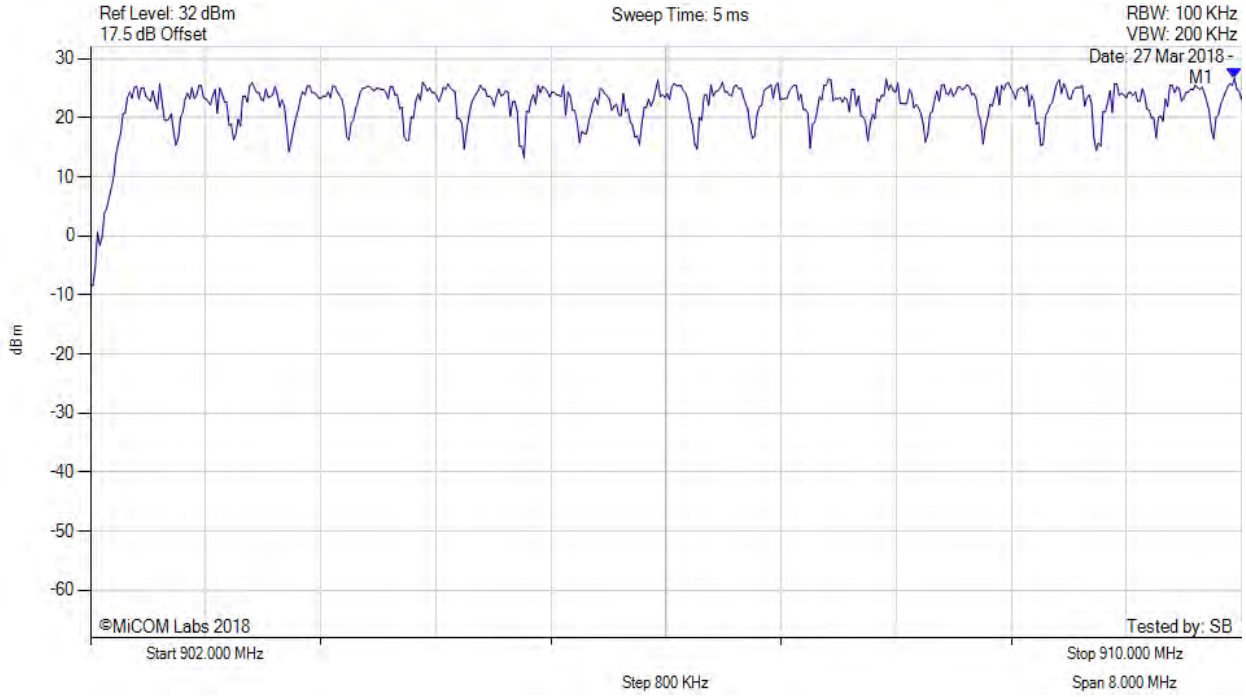


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.00 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: 600.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

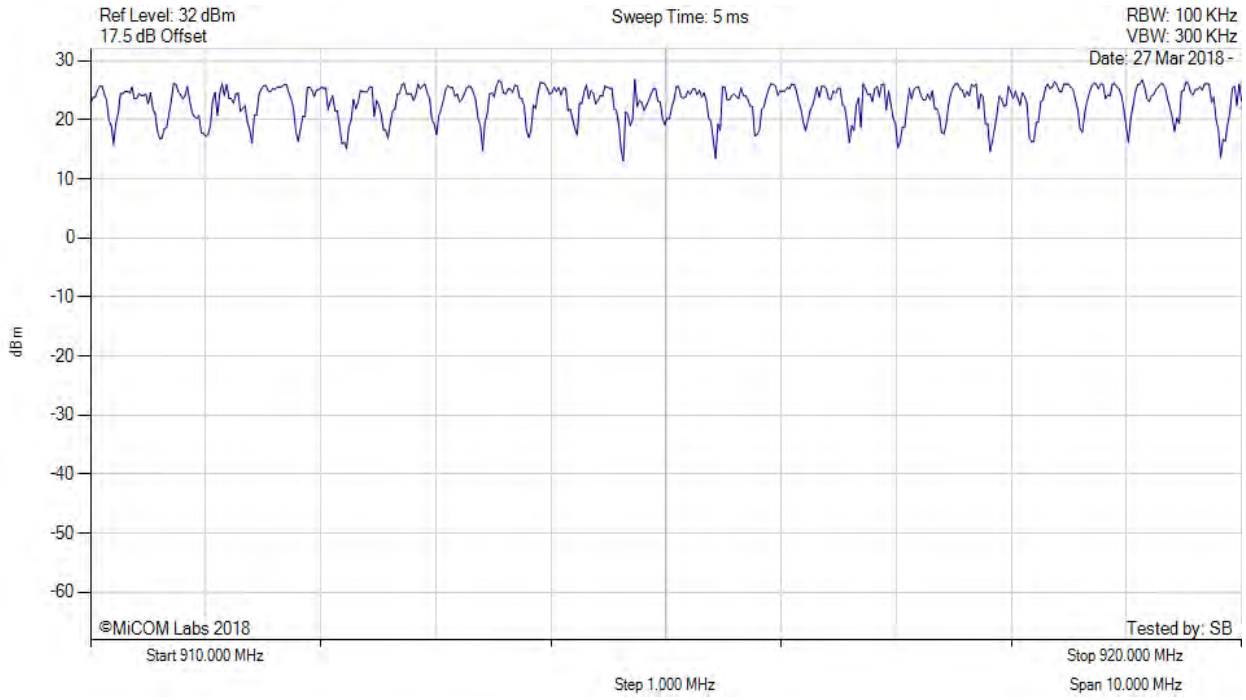


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 909.952 MHz : 26.733 dBm	Channel Frequency: 915.20 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: FHSS, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

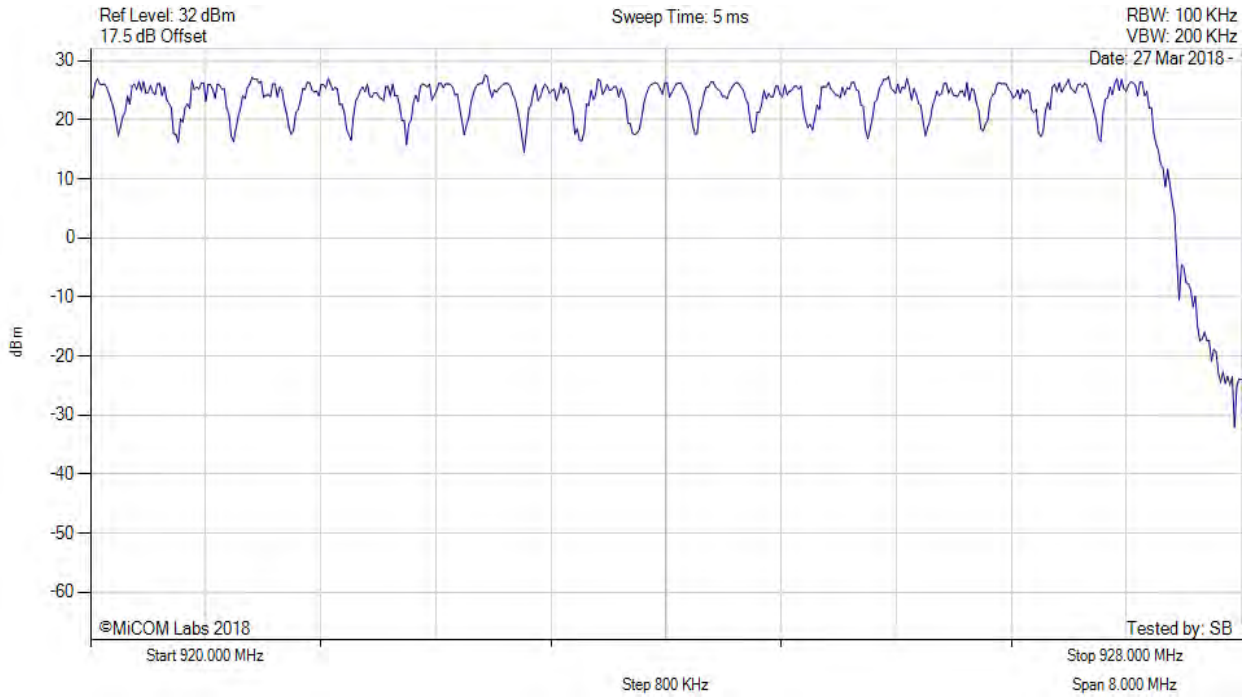


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.20 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: FHSS, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

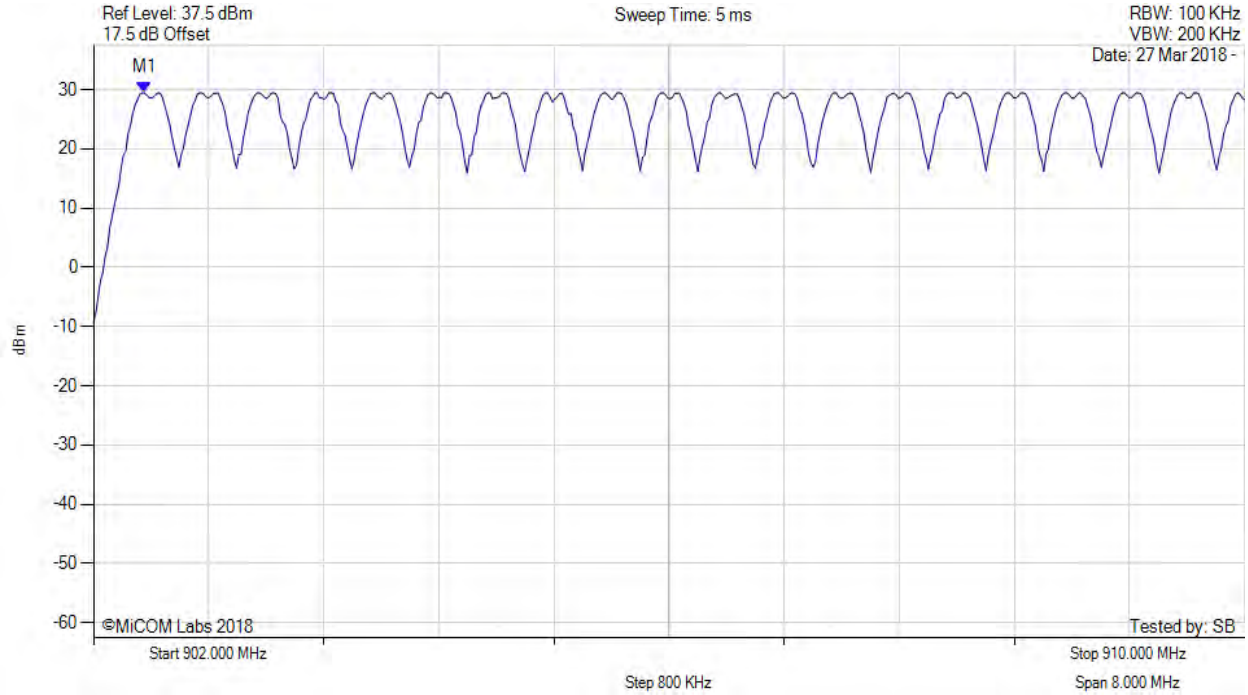


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.20 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

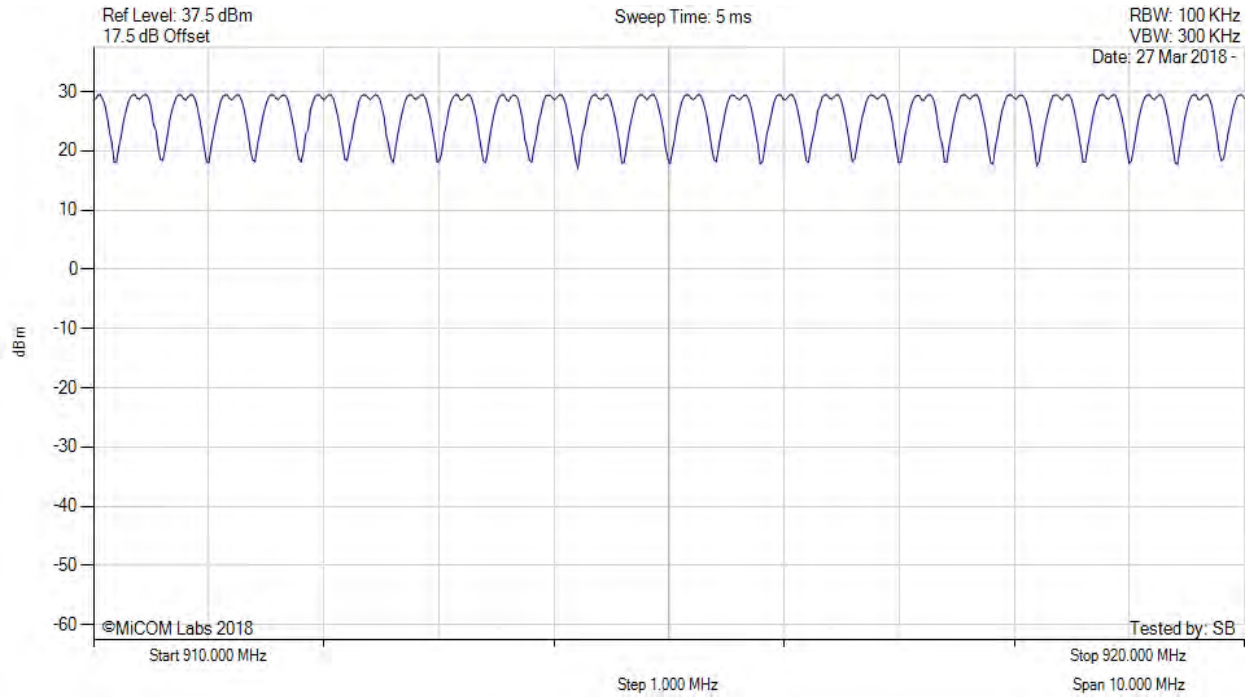


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.353 MHz : 29.465 dBm	Channel Frequency: 915.20 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

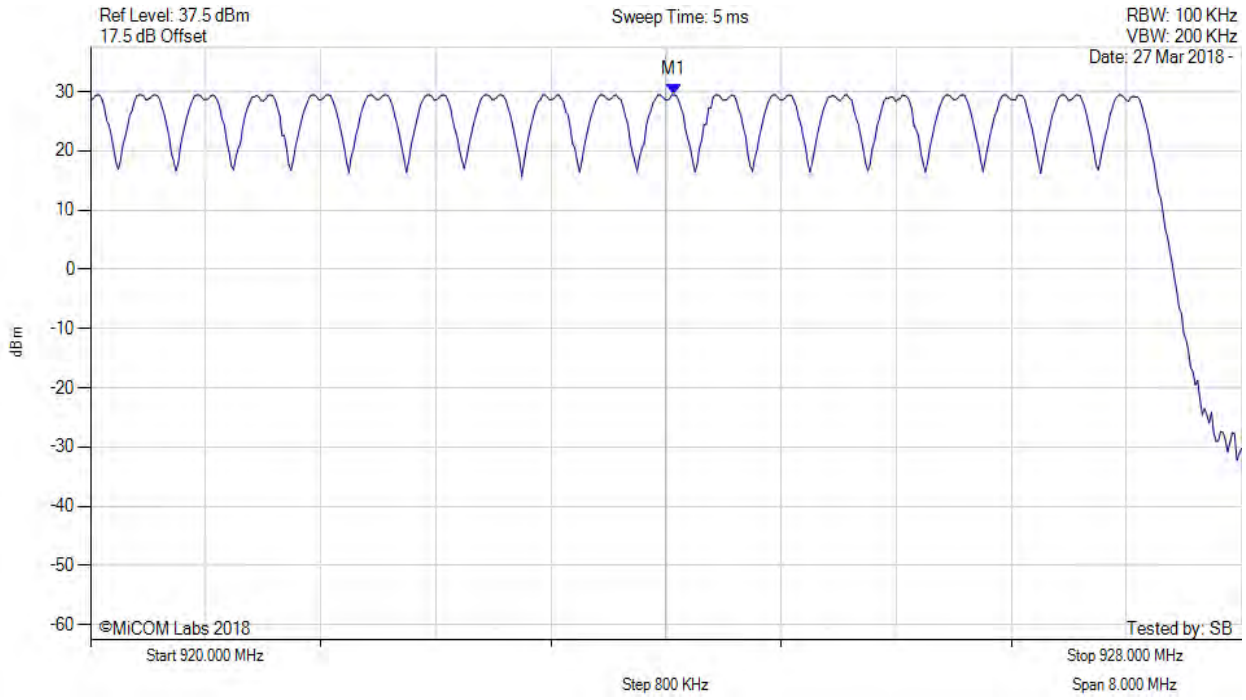


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.20 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

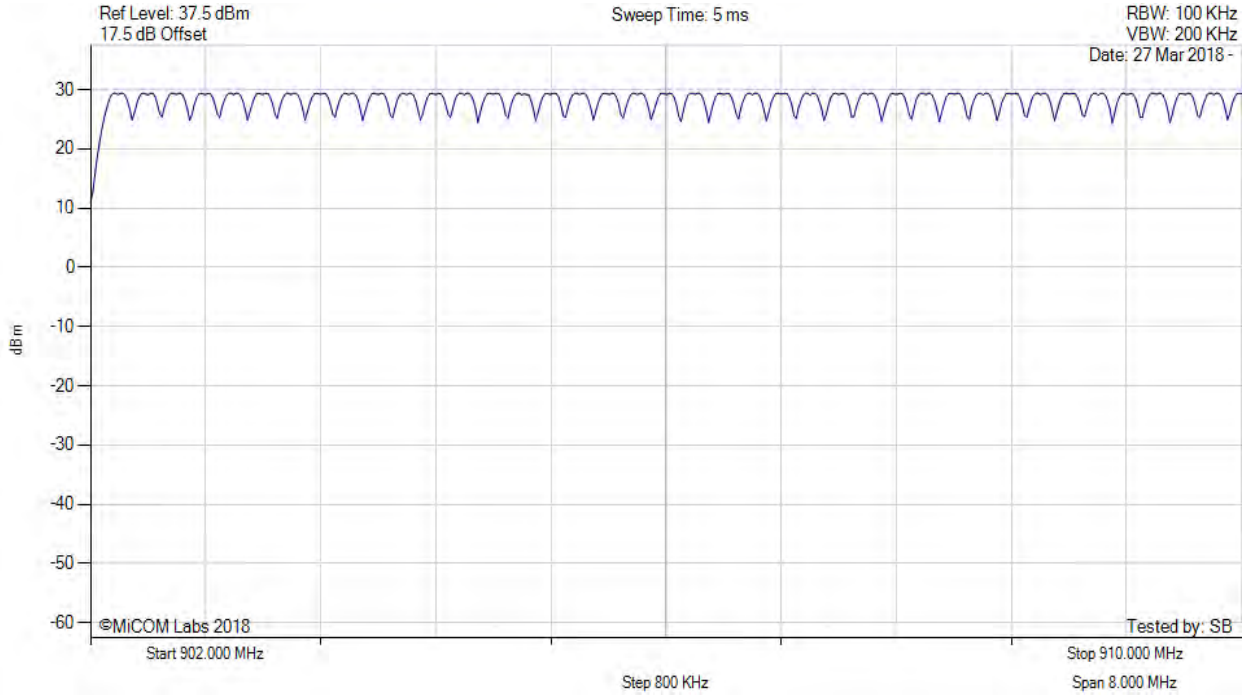


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 924.056 MHz : 29.471 dBm	Channel Frequency: 915.20 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

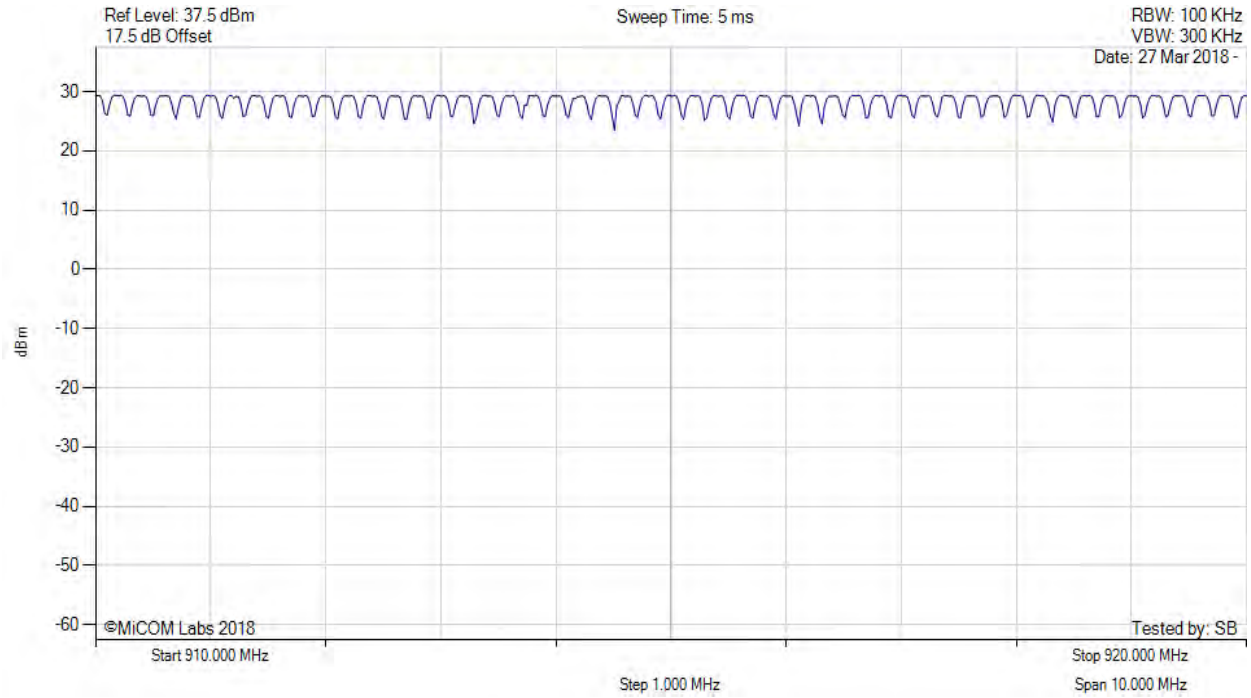


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.00 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

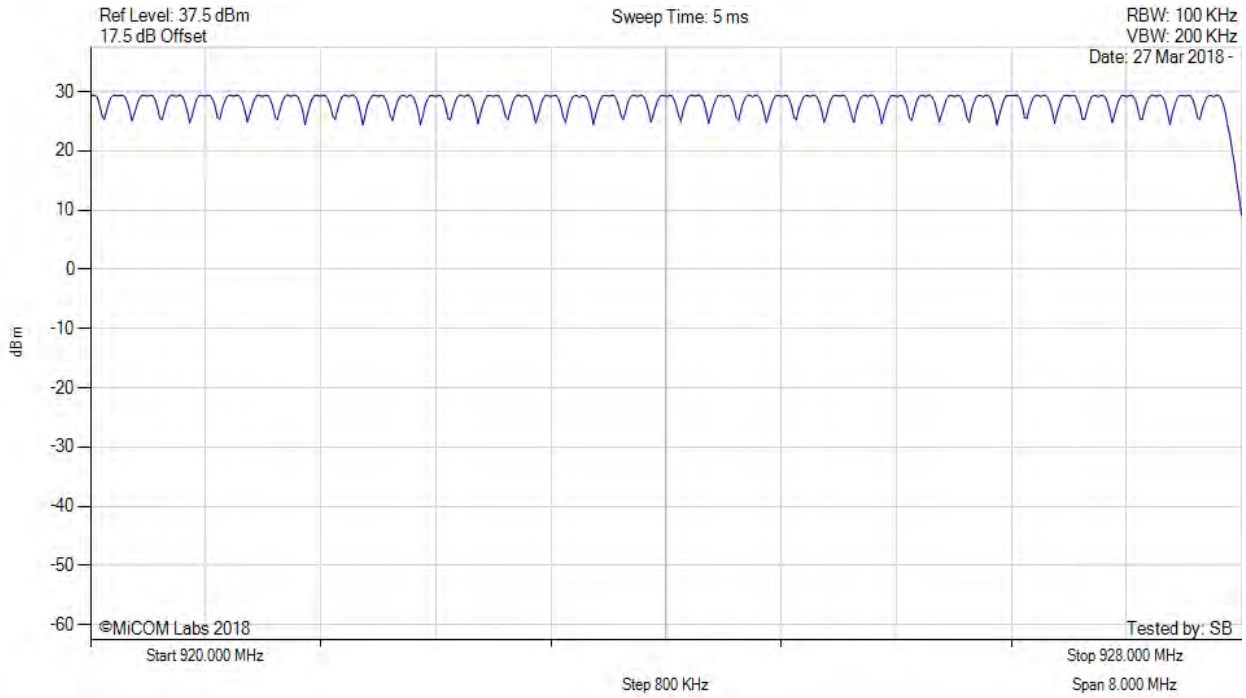


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.00 MHz

back to matrix

NUMBER OF HOPPING CHANNELS

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc



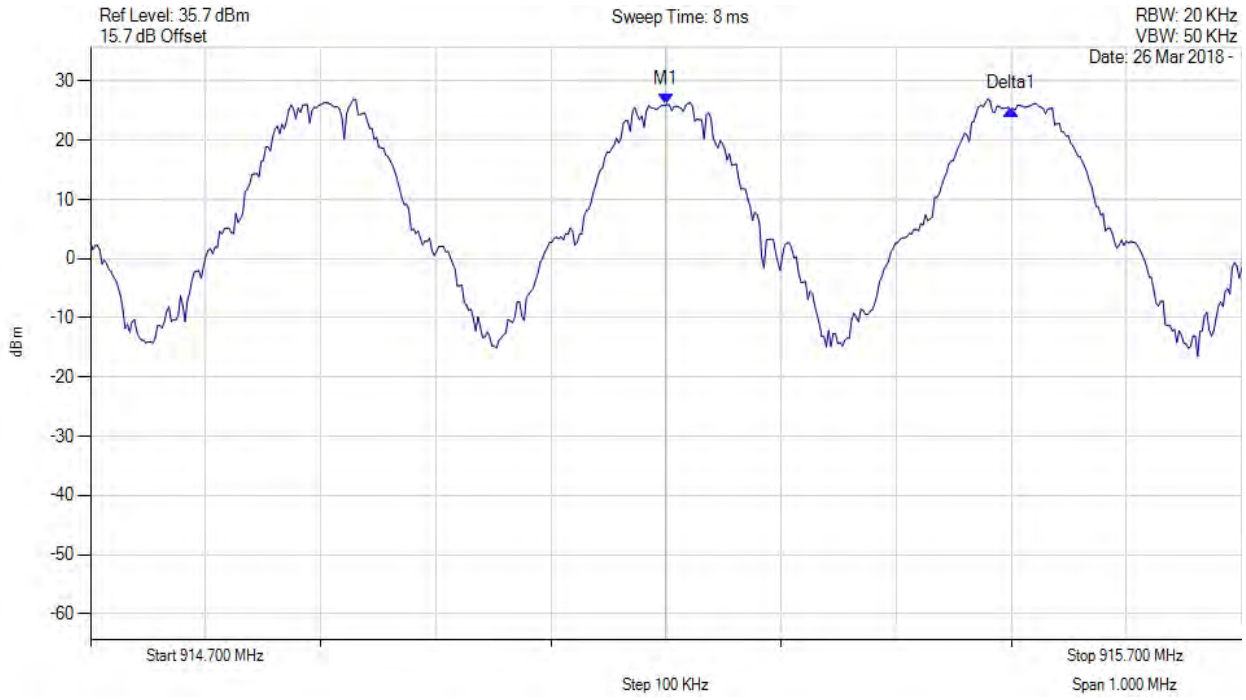
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW		Channel Frequency: 915.00 MHz

back to matrix

A.2.2. Channel Separation

CHANNEL SEPARATION

Variant: 100.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: 4 Vdc

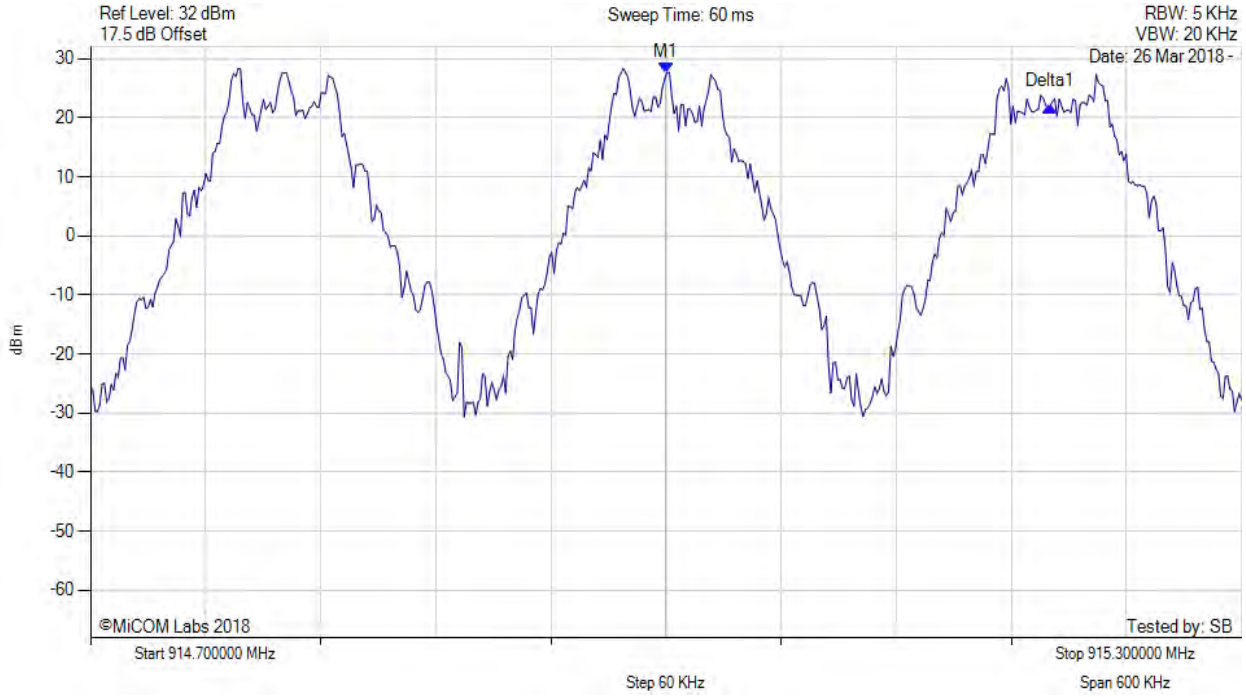


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 915.200 MHz : 26.015 dBm Delta1 : 300 KHz : -0.755 dB	Channel Frequency: 915.20 MHz

back to matrix

CHANNEL SEPARATION

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

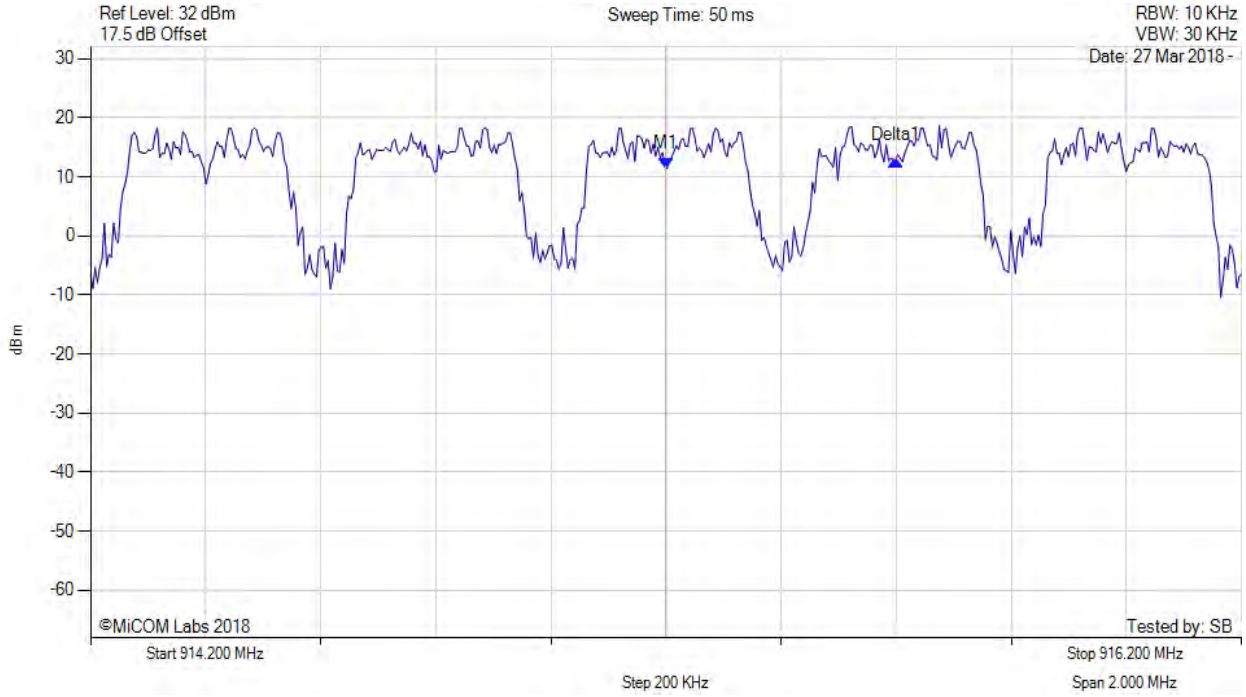


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 915.000 MHz : 27.625 dBm Delta1 : 200 KHz : -5.623 dB	Channel Frequency: 915.00 MHz

back to matrix

CHANNEL SEPARATION

Variant: 600.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

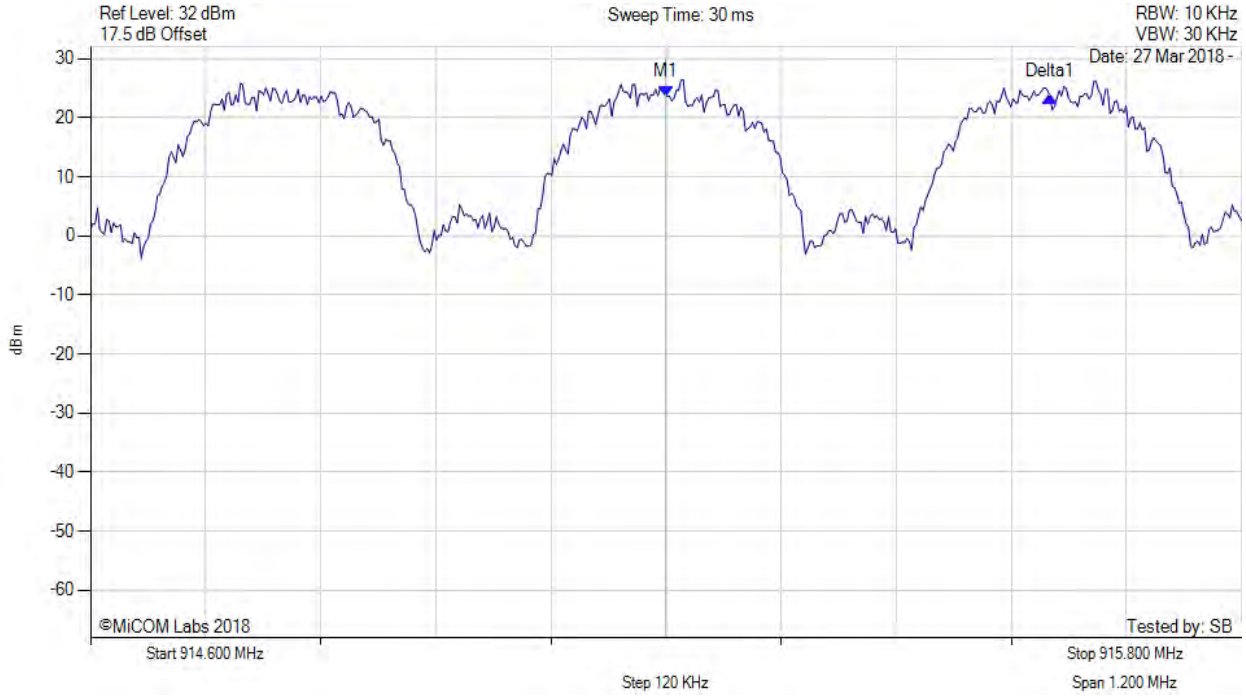


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 915.200 MHz : 11.457 dBm Delta1 : 400 KHz : 1.328 dB	Channel Frequency: 915.20 MHz

back to matrix

CHANNEL SEPARATION

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

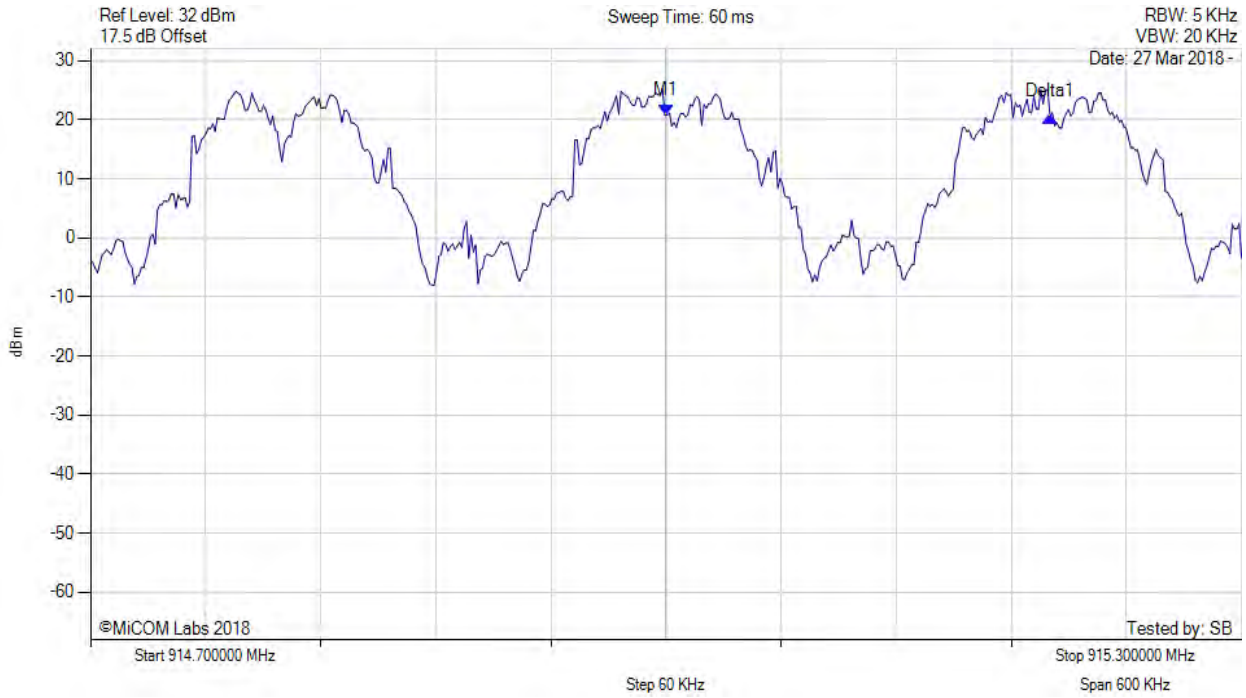


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 915.200 MHz : 23.639 dBm Delta1 : 400 KHz : -0.043 dB	Channel Frequency: 915.20 MHz

back to matrix

CHANNEL SEPARATION

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc



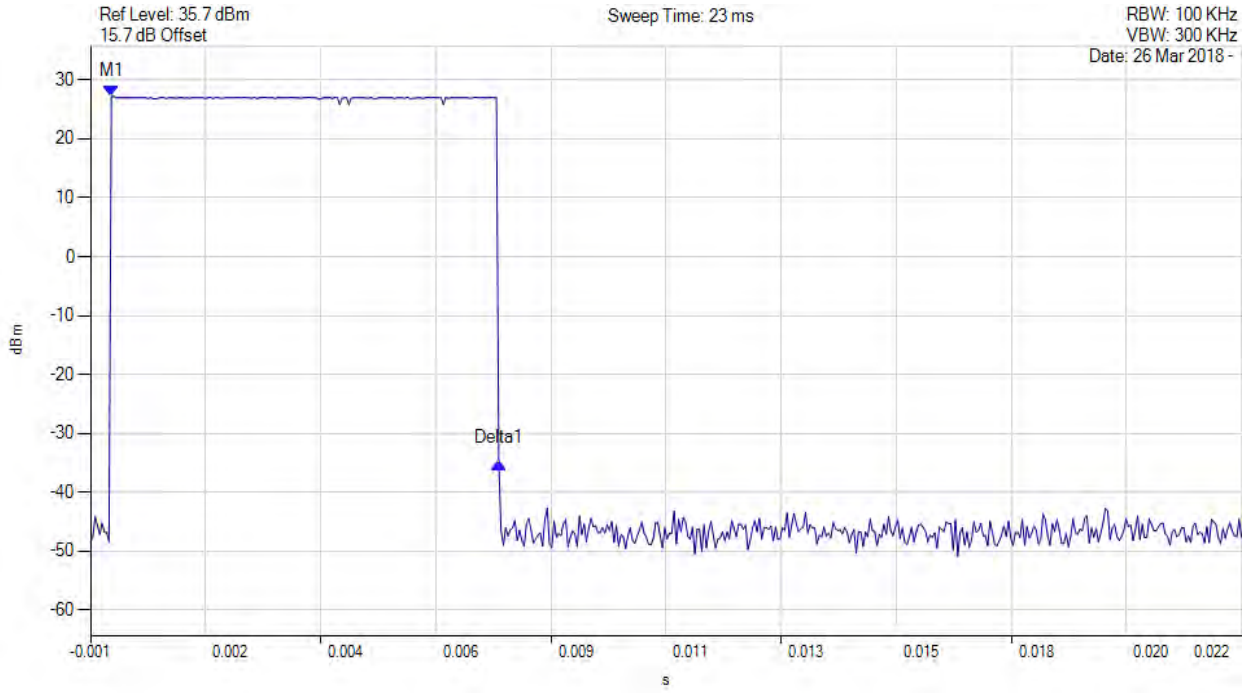
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 915.000 MHz : 20.786 dBm Delta1 : 200 KHz : -0.195 dB	Channel Frequency: 915.00 MHz

back to matrix

A.2.3. Dwell Time

Dwell Time

Variant: 100.00 KBit/s, Channel: 902.30 MHz, Chain a, Temp: 20, Voltage: 4 Vdc

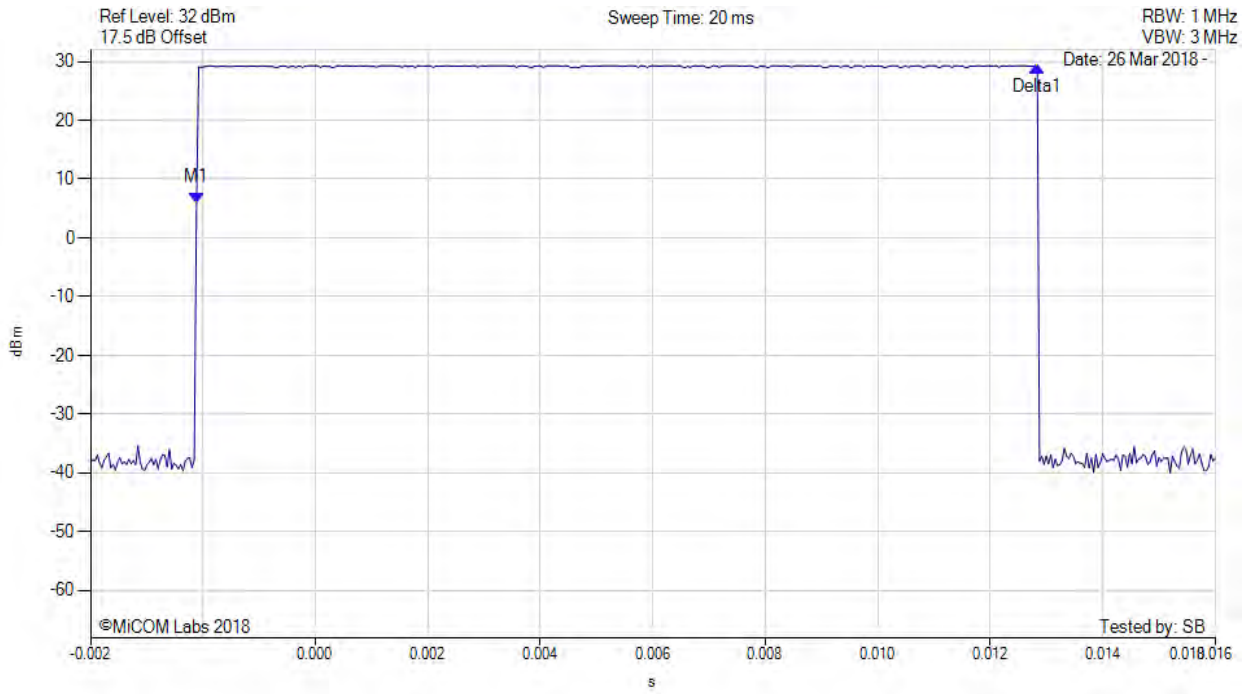


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = CLR/WRITE	M1(902.30 MHz) : 0.000 s : 27.156 dBm Delta1(902.30 MHz) : 0.008 s : -62.086 dB	Channel Frequency: 902.30 MHz

back to matrix

DWELL TIME

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

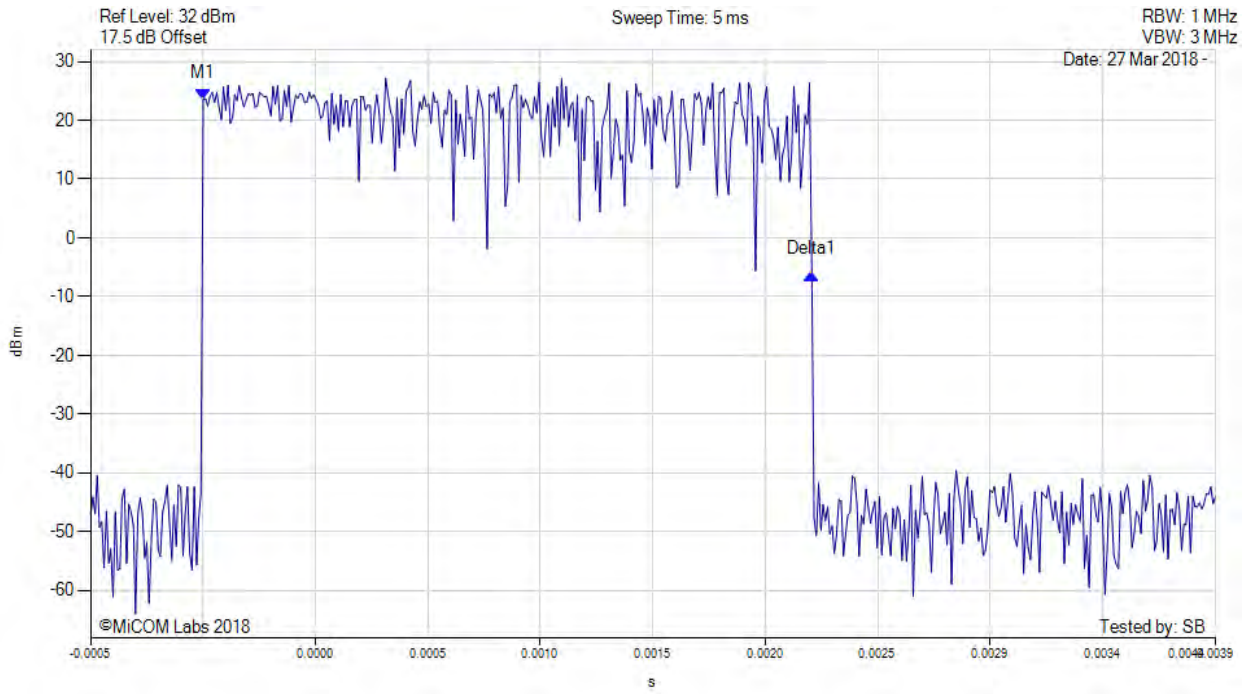


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.00 MHz) : 0.000 s : 5.976 dBm Delta1(915.00 MHz) : 0.015 s : 23.292 dB	Channel Frequency: 915.00 MHz

back to matrix

DWELL TIME

Variant: 600.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

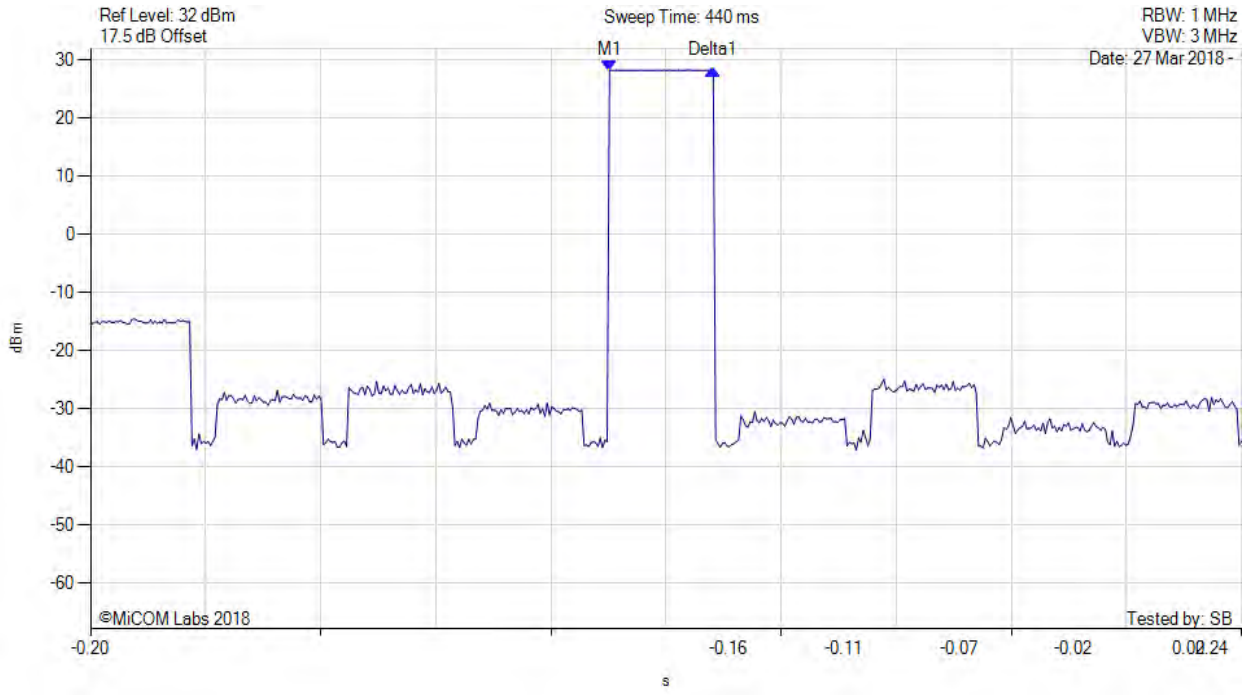


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = SAMPLE Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.20 MHz) : 0.000 s : 23.639 dBm Delta1(915.20 MHz) : 0.003 s : -29.705 dB	Channel Frequency: 915.20 MHz

back to matrix

DWELL TIME

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

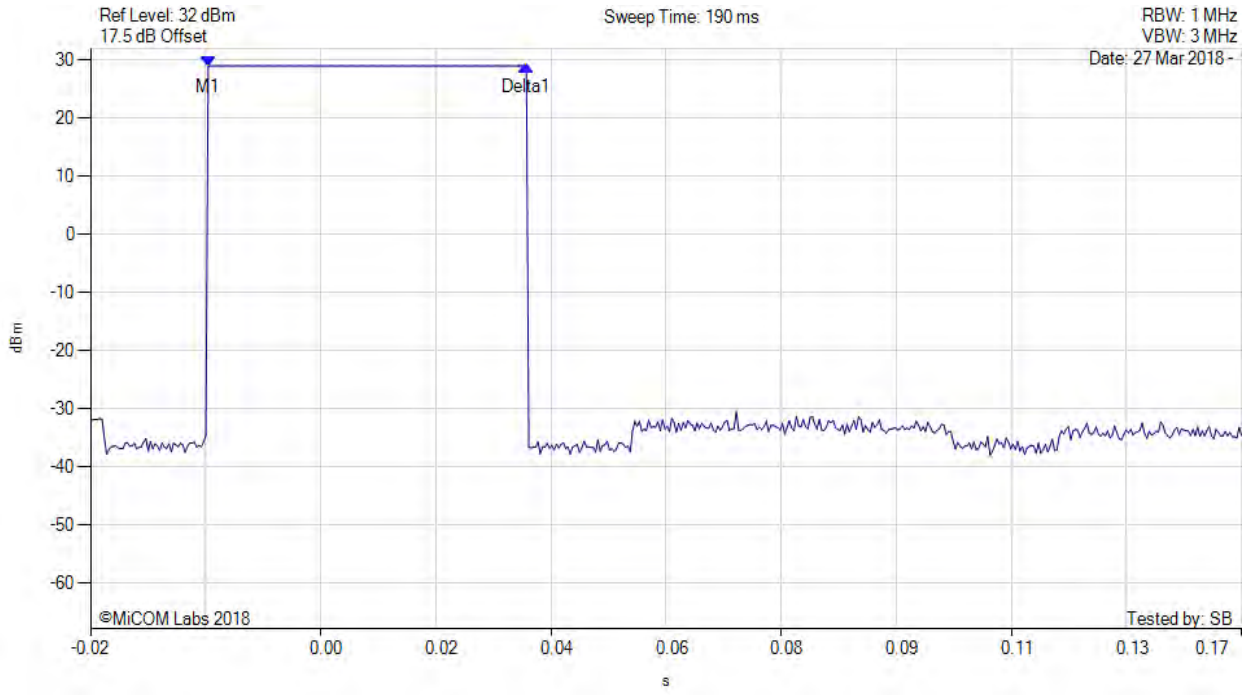


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.20 MHz) : -0.002 s : 28.292 dBm Delta1(915.20 MHz) : 0.040 s : 0.049 dB	Channel Frequency: 915.20 MHz

back to matrix

DWELL TIME

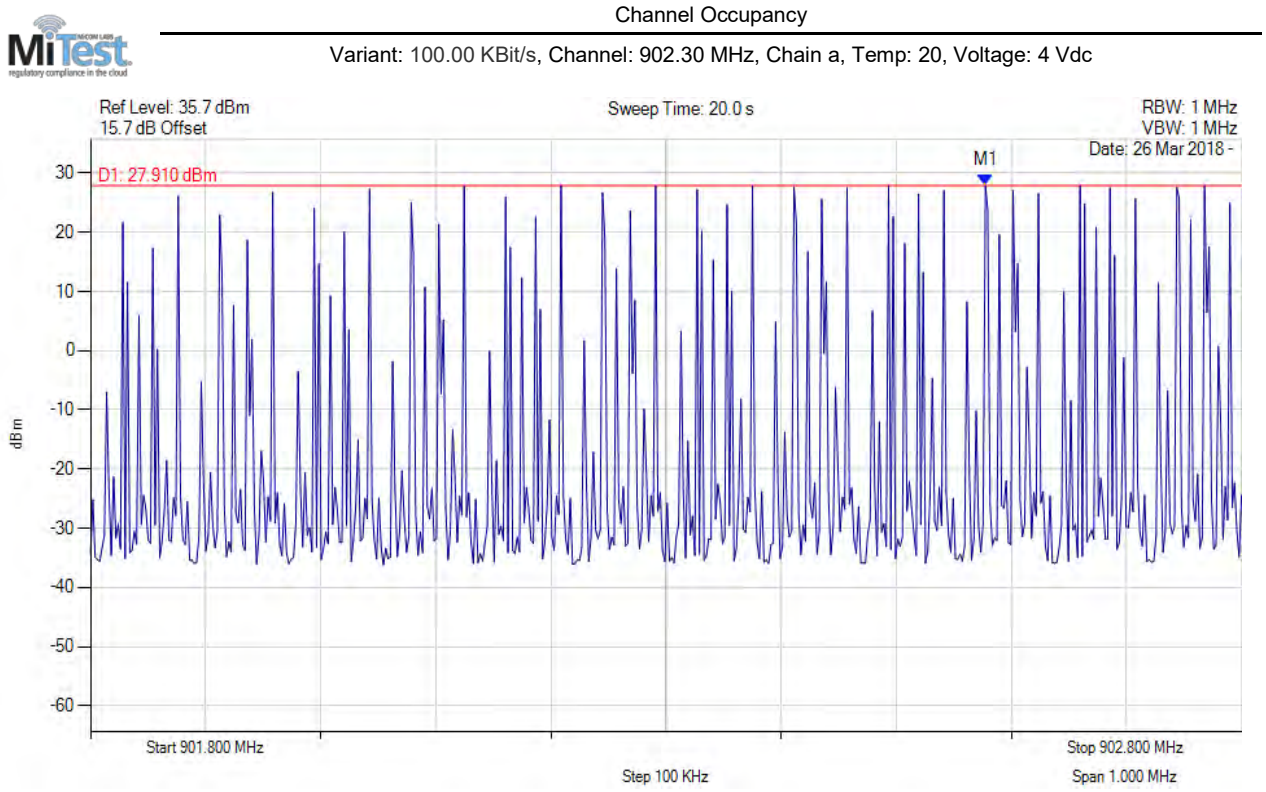
Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.00 MHz) : -0.001 s : 29.000 dBm Delta1(915.00 MHz) : 0.053 s : 0.051 dB	Channel Frequency: 915.00 MHz

back to matrix

A.2.4. Channel Occupancy

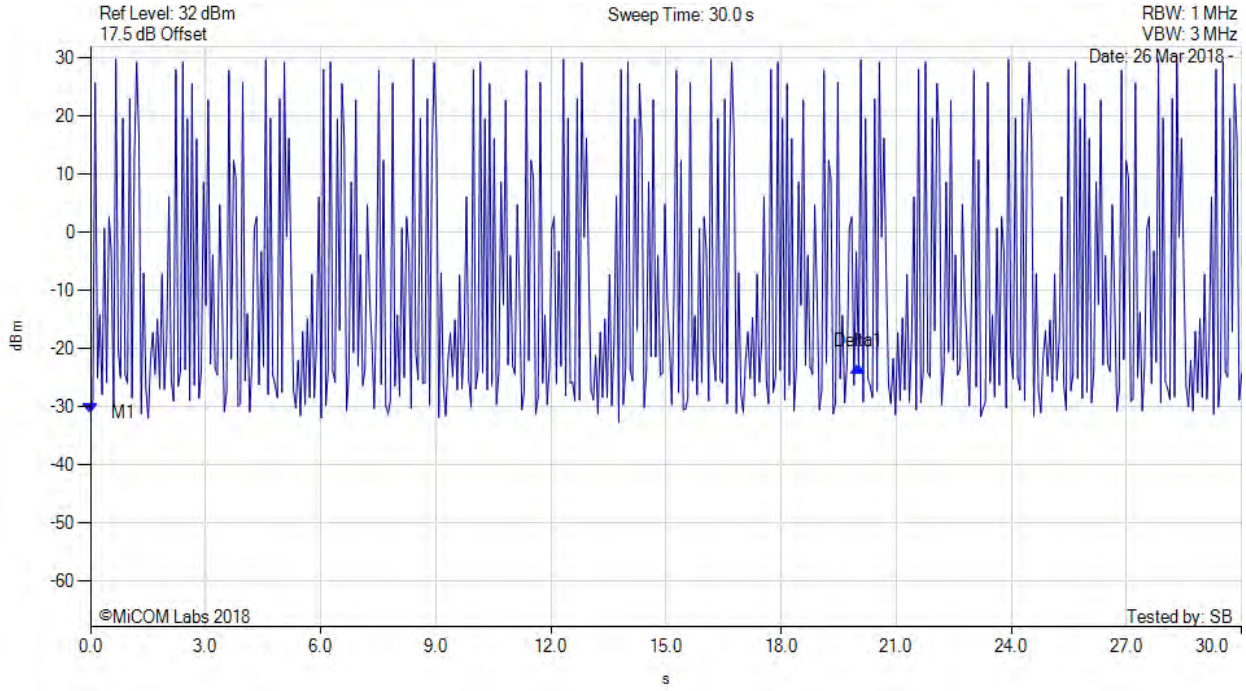


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = CLR/WRITE	M1 : 902.578 MHz : 27.858 dBm	Channel Frequency: 902.30 MHz

back to matrix

CHANNEL OCCUPANCY

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

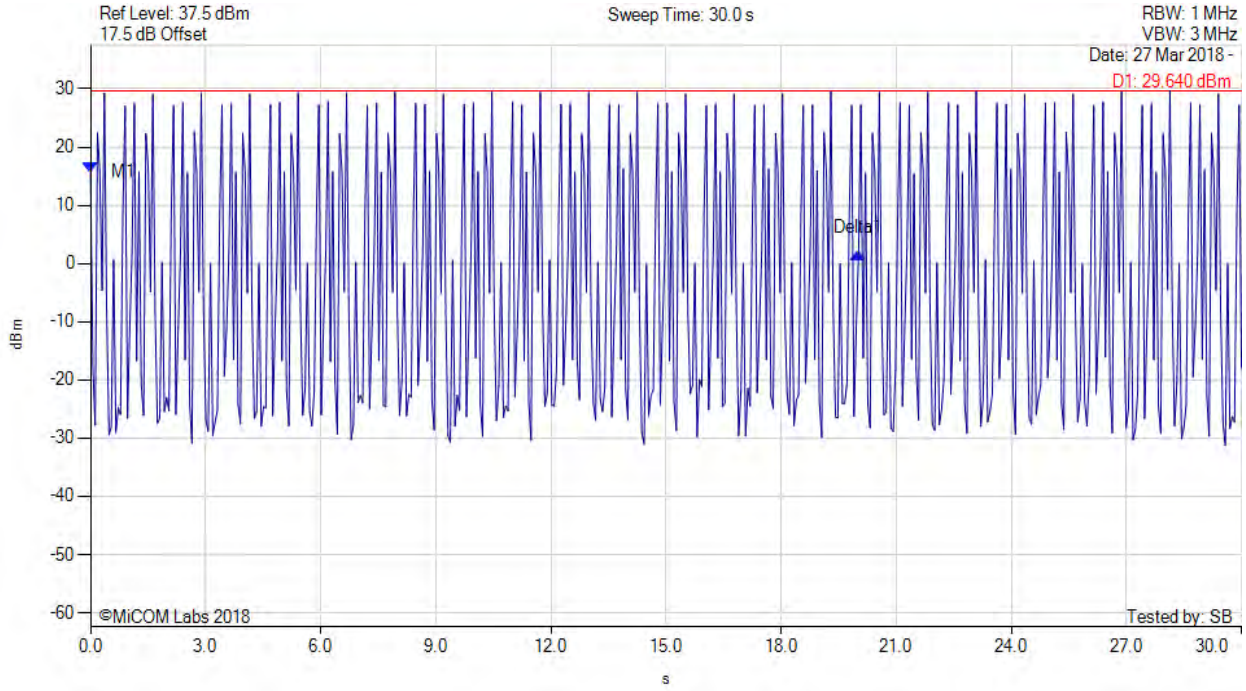


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.00 MHz) : 0.000 s : -31.083 dBm Delta1(915.00 MHz) : 20.000 s : 8.084 dB	Channel Frequency: 915.00 MHz

back to matrix

CHANNEL OCCUPANCY

Variant: 600.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

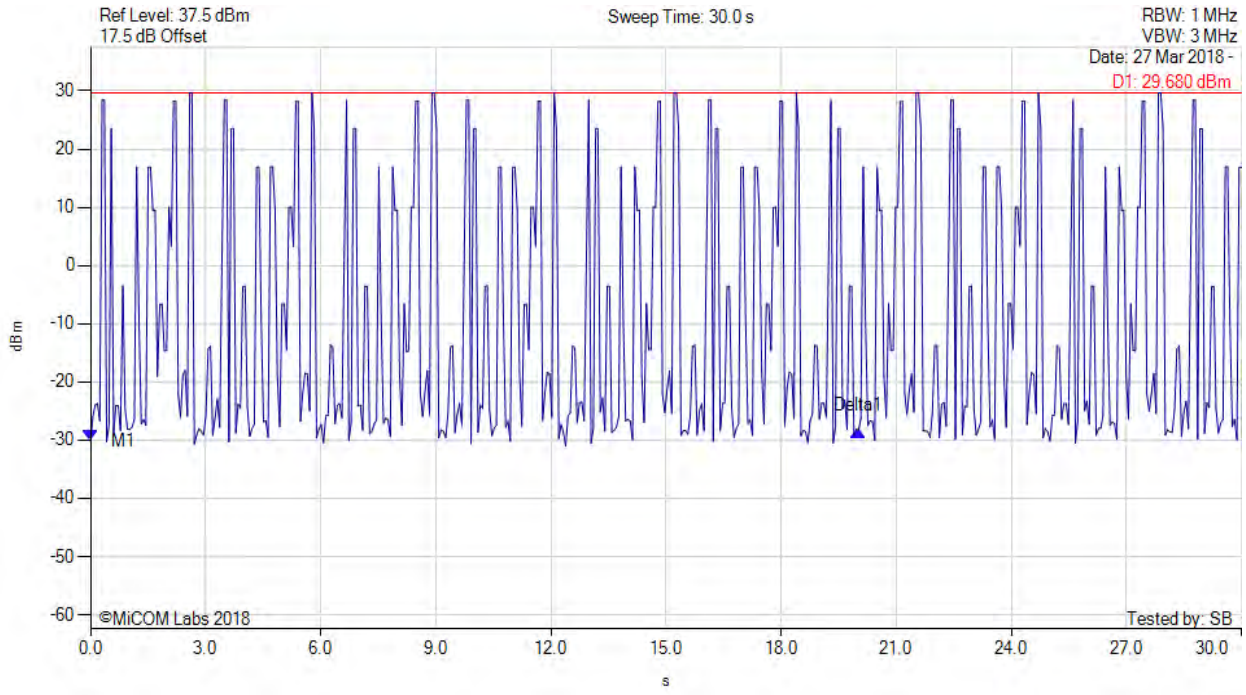


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.20 MHz) : 0.000 s : 15.684 dBm Delta1(915.20 MHz) : 20.000 s : -13.785 dB	Channel Frequency: 915.20 MHz

back to matrix

CHANNEL OCCUPANCY

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

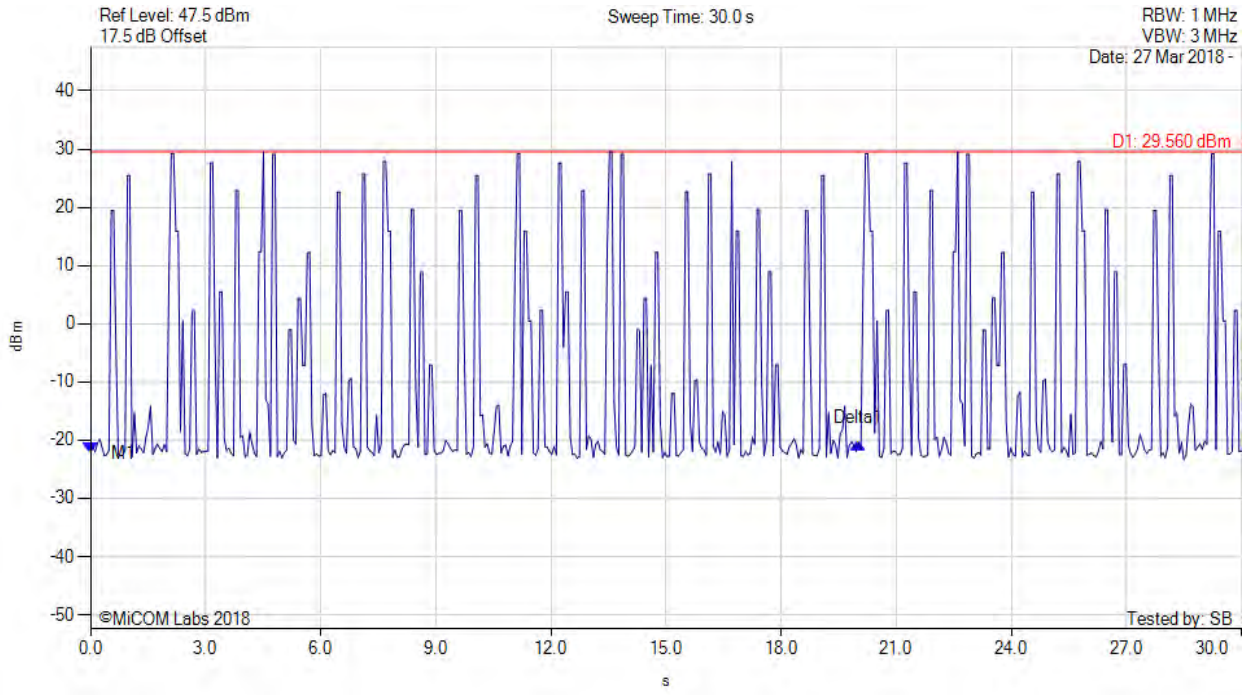


Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1(915.20 MHz) : 0.000 s : -30.163 dBm Delta1(915.20 MHz) : 20.000 s : 1.800 dB	Channel Frequency: 915.20 MHz

back to matrix

CHANNEL OCCUPANCY

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 40 Trace Mode = VIEW	M1(915.00 MHz) : 0.000 s : -22.160 dBm Delta1(915.00 MHz) : 20.000 s : 1.729 dB	Channel Frequency: 915.00 MHz

back to matrix

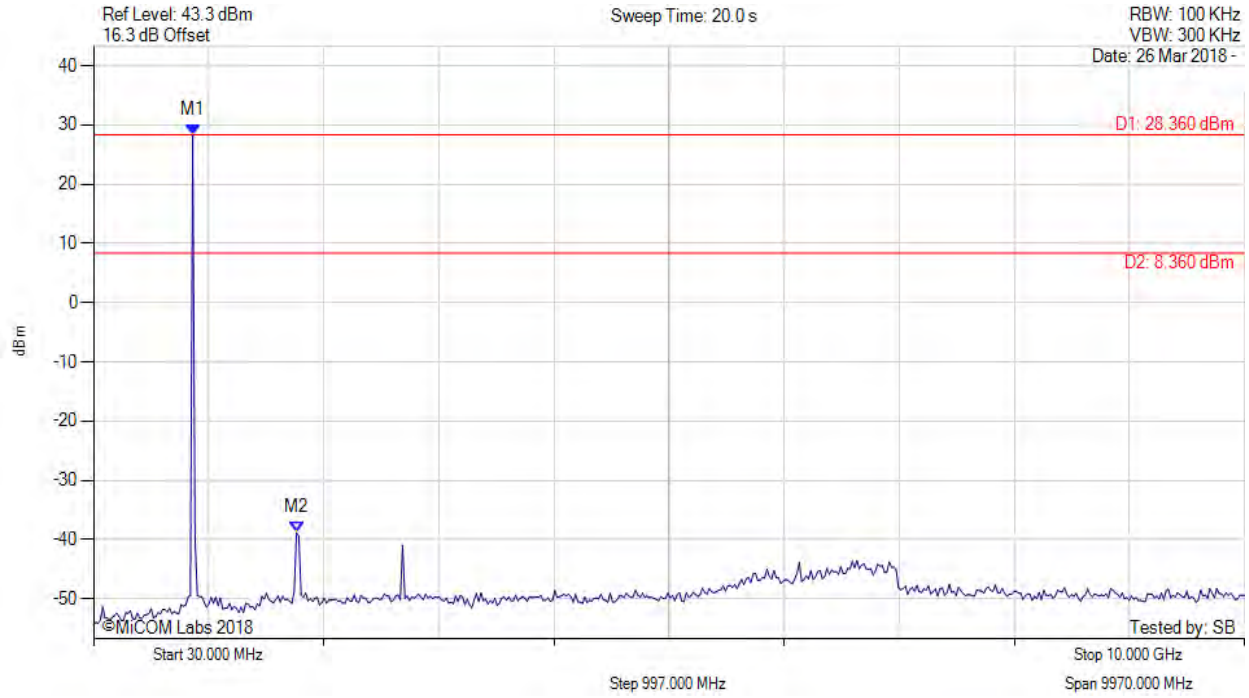
A.3. Emissions

A.3.1. Conducted Emissions

A.3.1.1. Conducted Unwanted Spurious Emissions

UNWANTED EMISSIONS PEAK

Variant: 100.00 KBit/s, Channel: 902.30 MHz, Chain a, Temp: 20, Voltage: Vdc

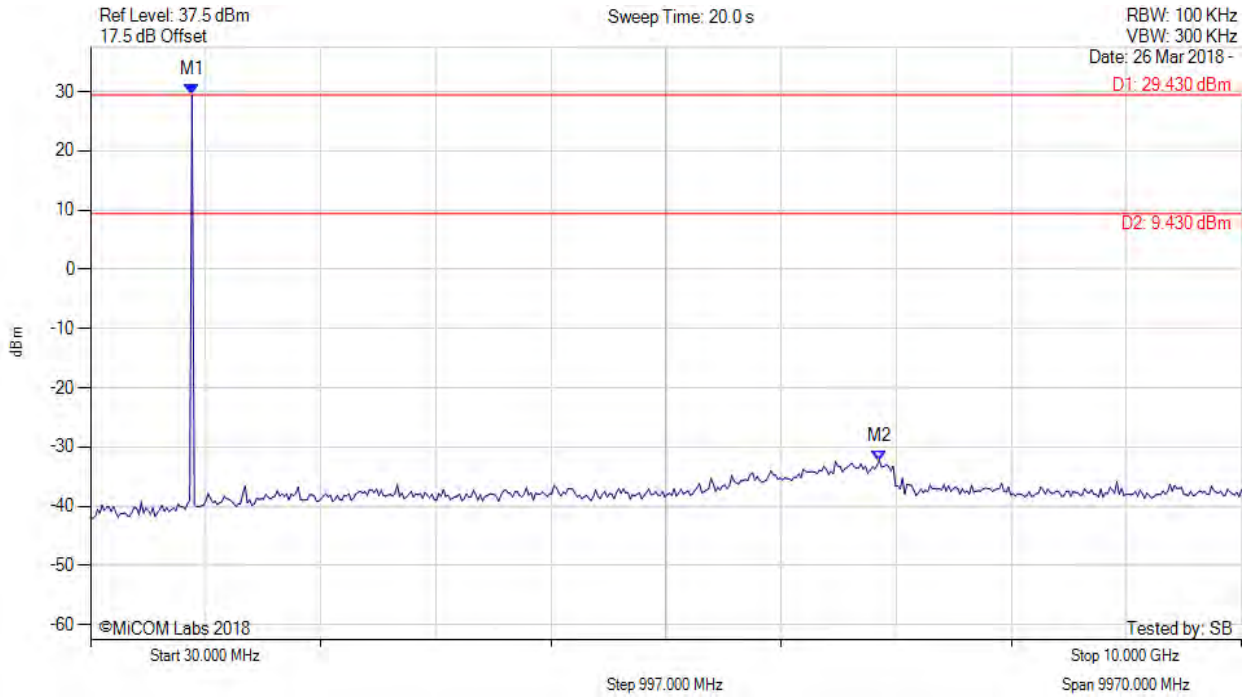


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 889.138 MHz : 28.364 dBm M2 : 1788.236 MHz : -38.845 dBm	Limit: 8.36 dBm Margin: -47.20 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 100.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

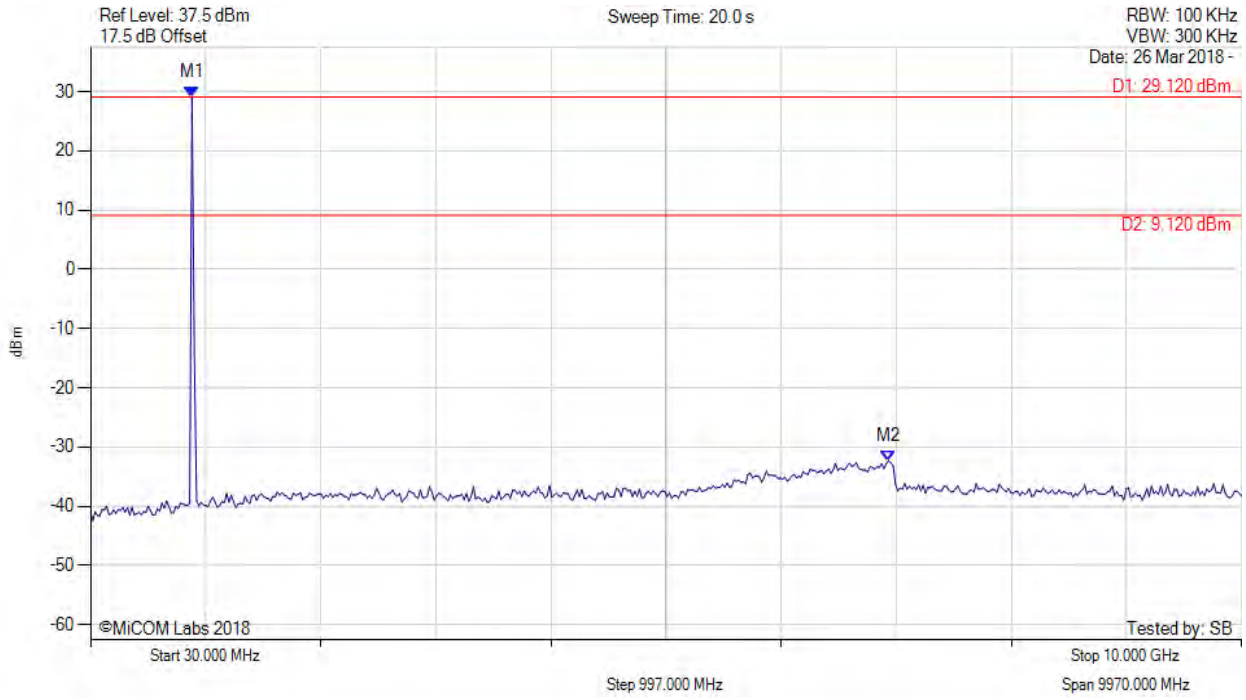


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 909.118 MHz : 29.430 dBm M2 : 6863.146 MHz : -32.304 dBm	Limit: 9.43 dBm Margin: -41.73 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 100.00 KBit/s, Channel: 926.90 MHz, Chain a, Temp: 20, Voltage: Vdc

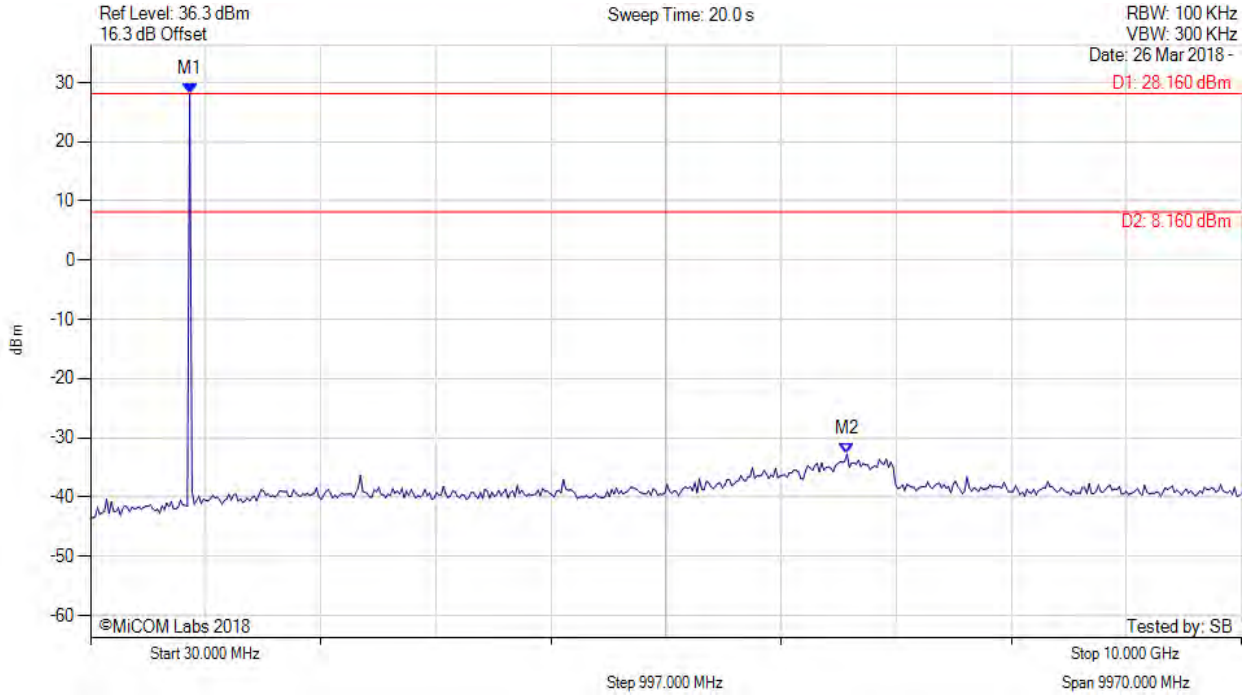


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 909.118 MHz : 29.117 dBm M2 : 6943.066 MHz : -32.359 dBm	Limit: 9.12 dBm Margin: -41.48 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 50.00 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

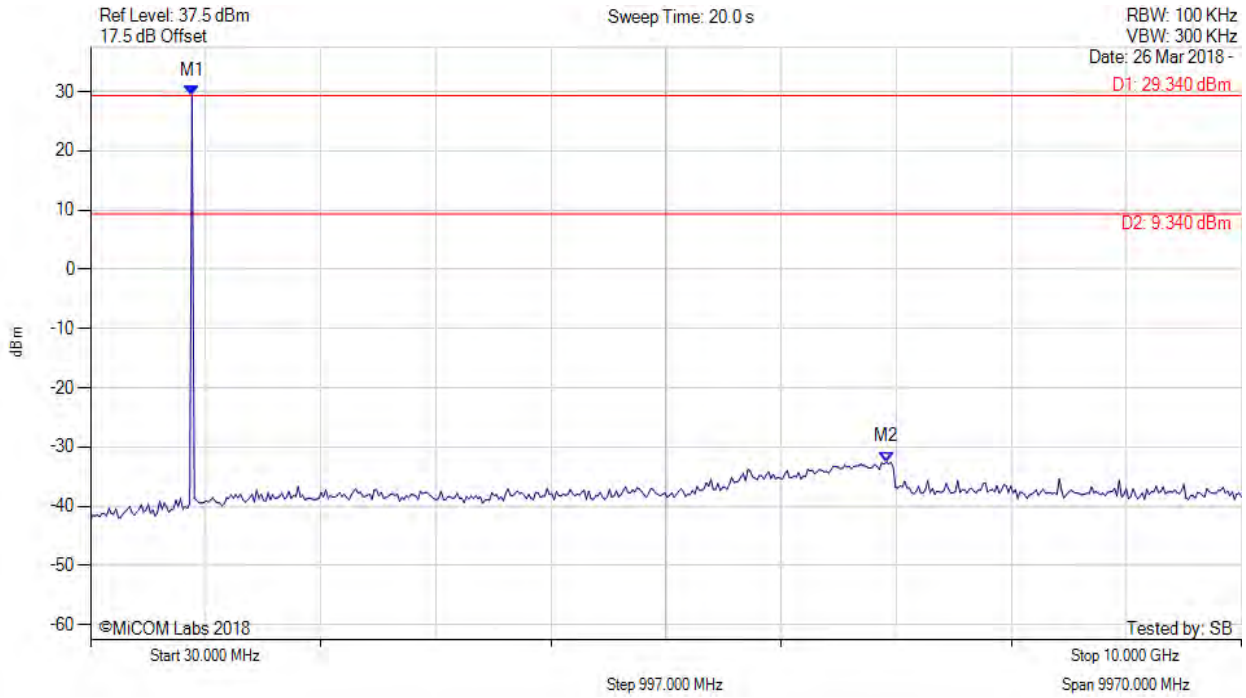


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 889.138 MHz : 28.159 dBm M2 : 6583.427 MHz : -32.717 dBm	Limit: 8.16 dBm Margin: -40.88 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 50.00 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

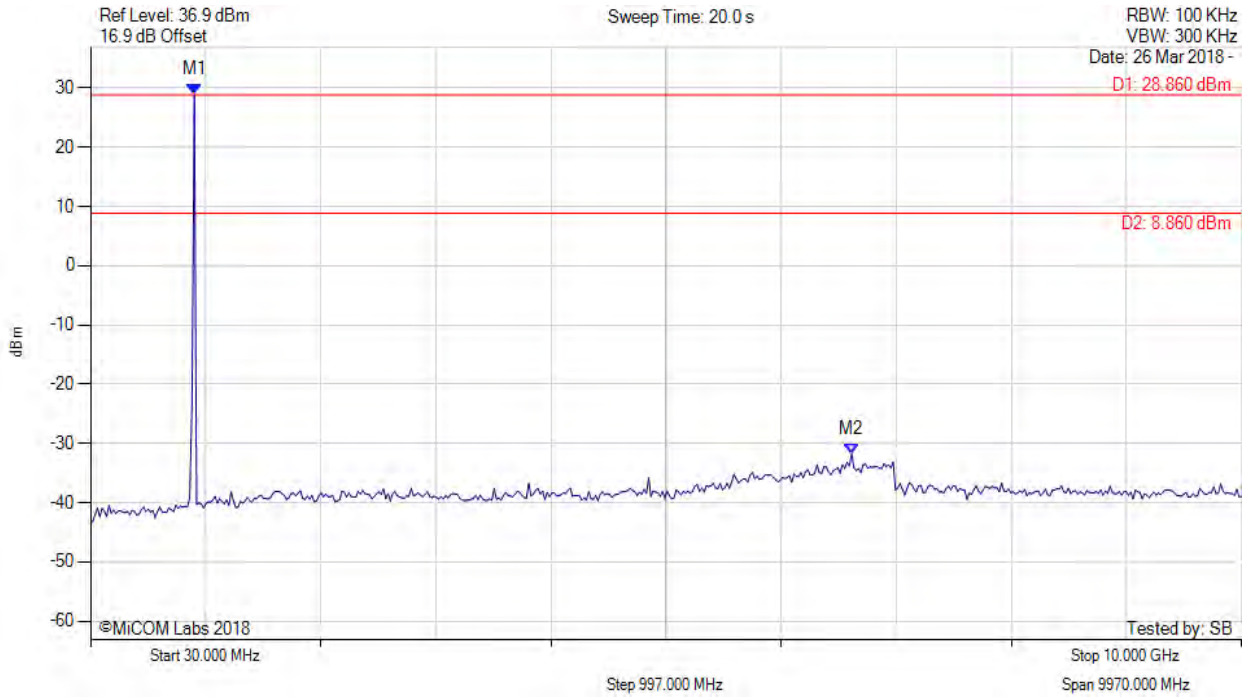


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 909.118 MHz : 29.343 dBm M2 : 6923.086 MHz : -32.534 dBm	Limit: 9.34 dBm Margin: -41.87 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 50.00 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc

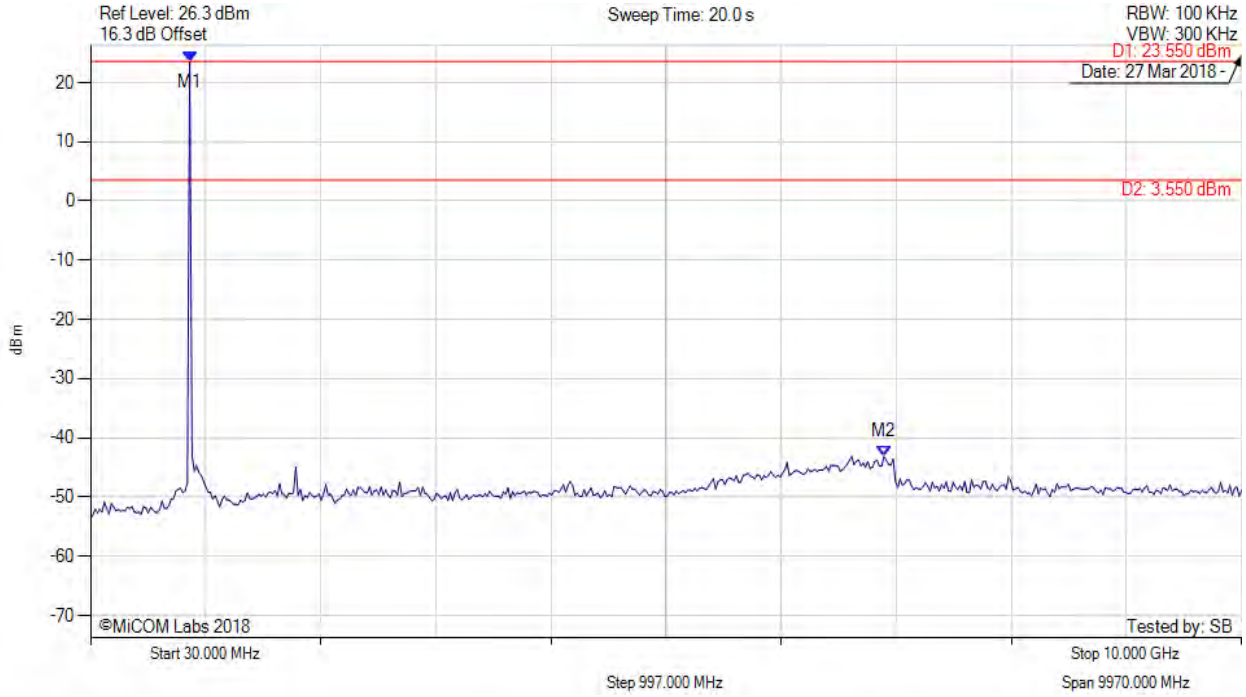


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 929.098 MHz : 28.863 dBm M2 : 6623.387 MHz : -31.810 dBm	Limit: 8.86 dBm Margin: -40.67 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 600.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

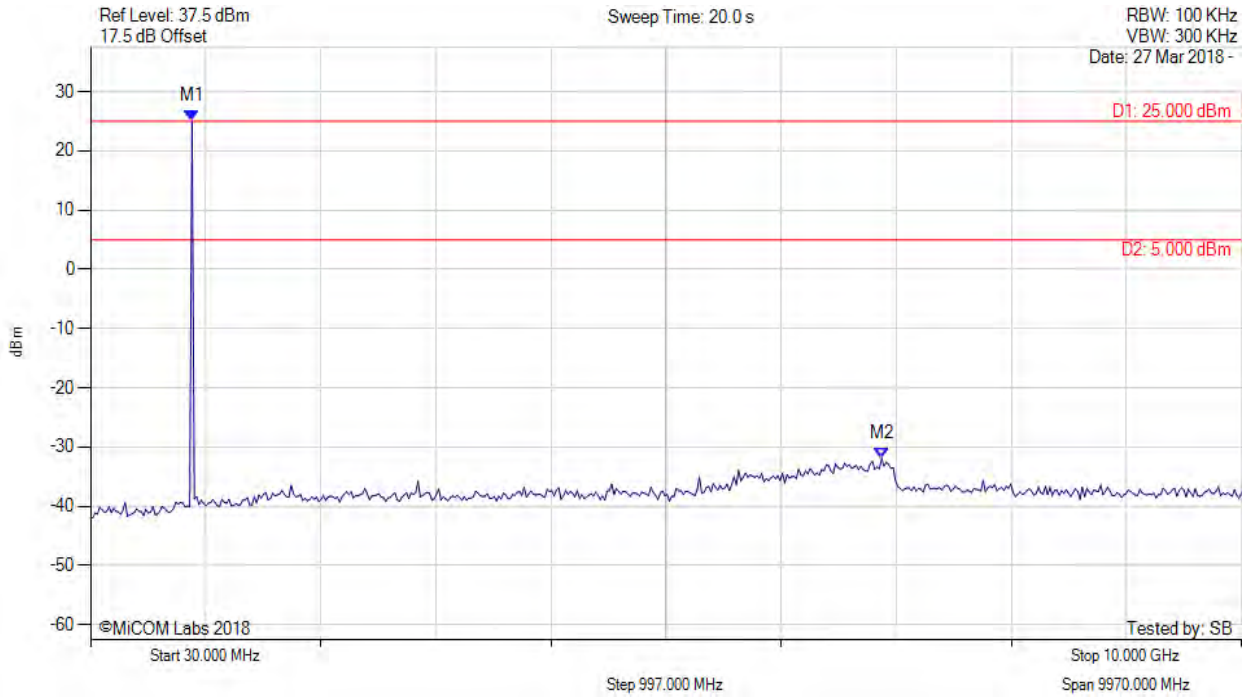


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 889.138 MHz : 23.552 dBm M2 : 6903.106 MHz : -43.140 dBm	Limit: 3.55 dBm Margin: -46.69 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 600.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

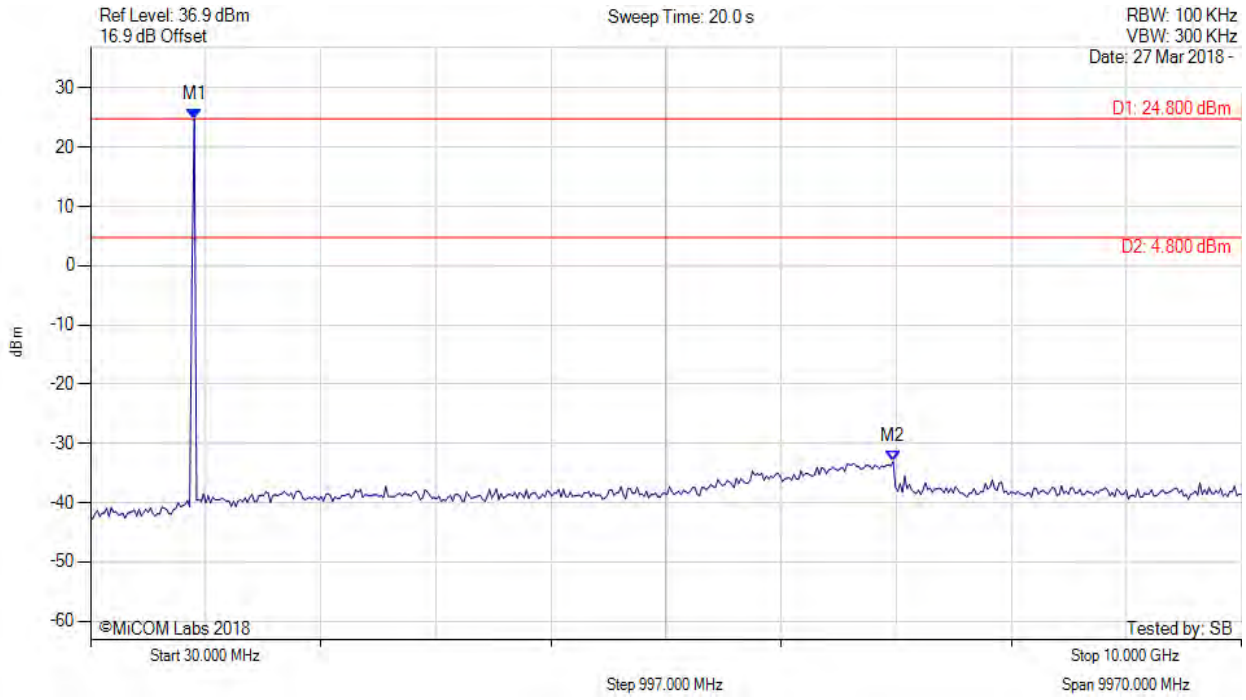


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 909.118 MHz : 25.001 dBm M2 : 6883.126 MHz : -31.983 dBm	Limit: 5.00 dBm Margin: -36.98 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: 600.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

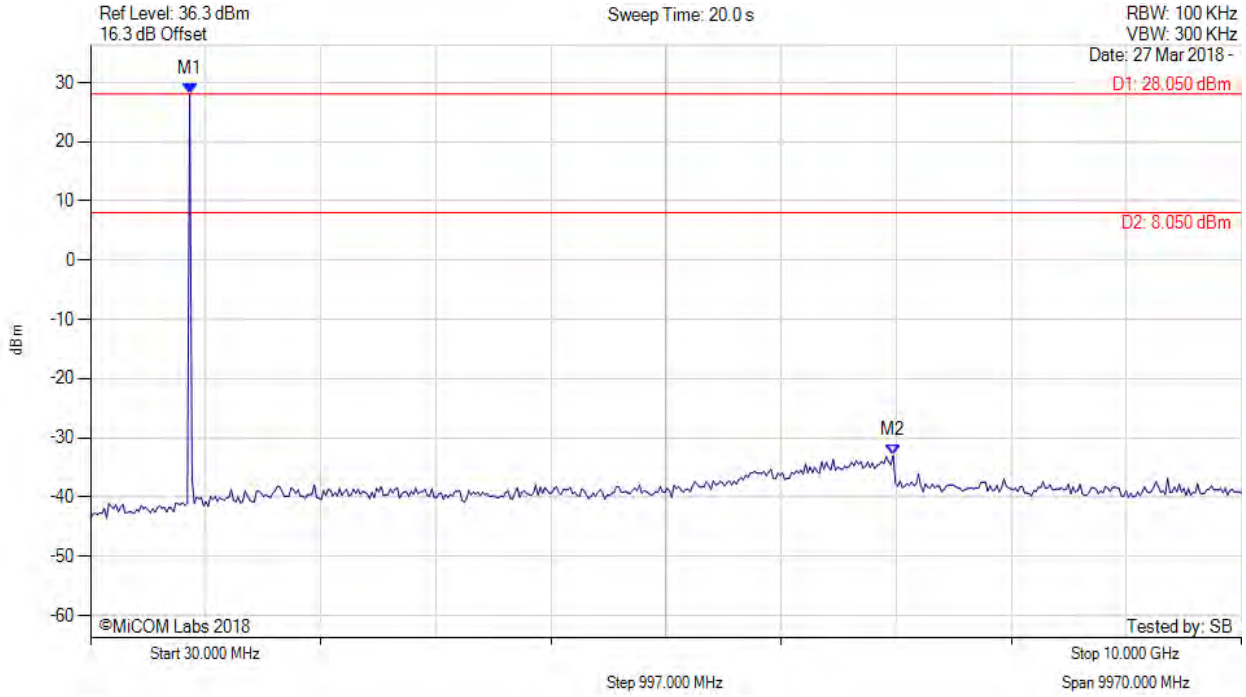


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 929.098 MHz : 24.795 dBm M2 : 6983.026 MHz : -33.093 dBm	Limit: 4.80 dBm Margin: -37.89 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

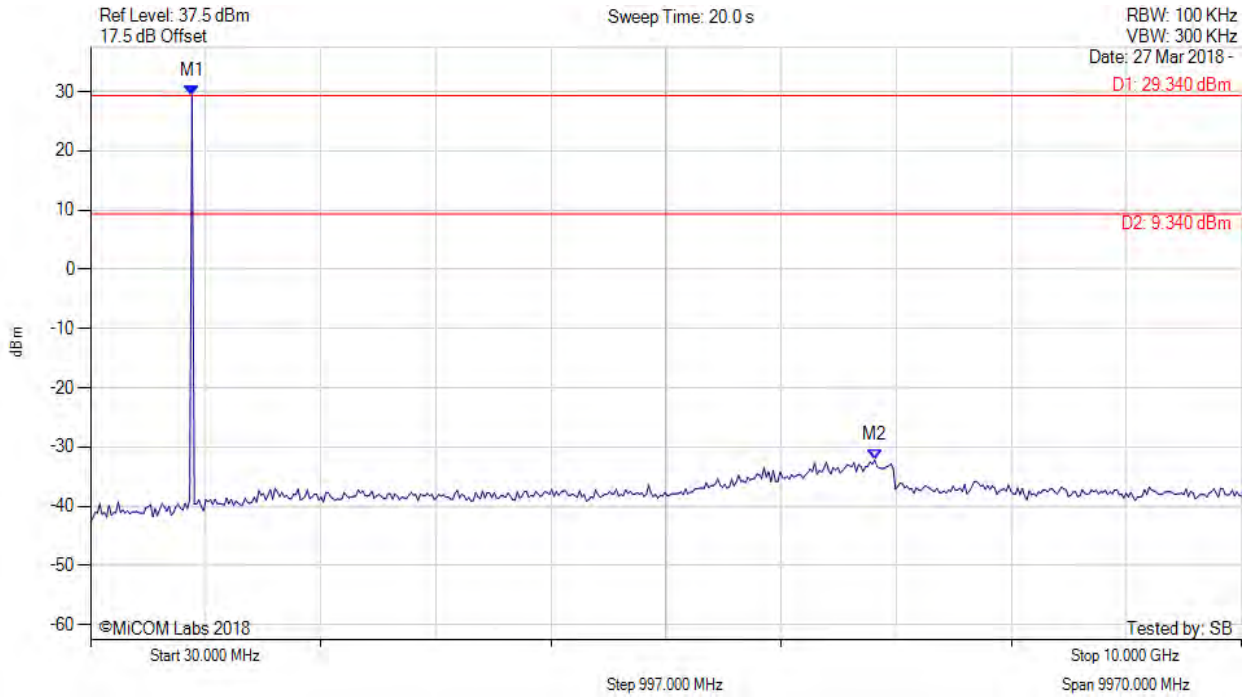


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 889.138 MHz : 28.047 dBm M2 : 6983.026 MHz : -32.990 dBm	Limit: 8.05 dBm Margin: -41.04 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 915.20 MHz, Chain a, Temp: 20, Voltage: Vdc

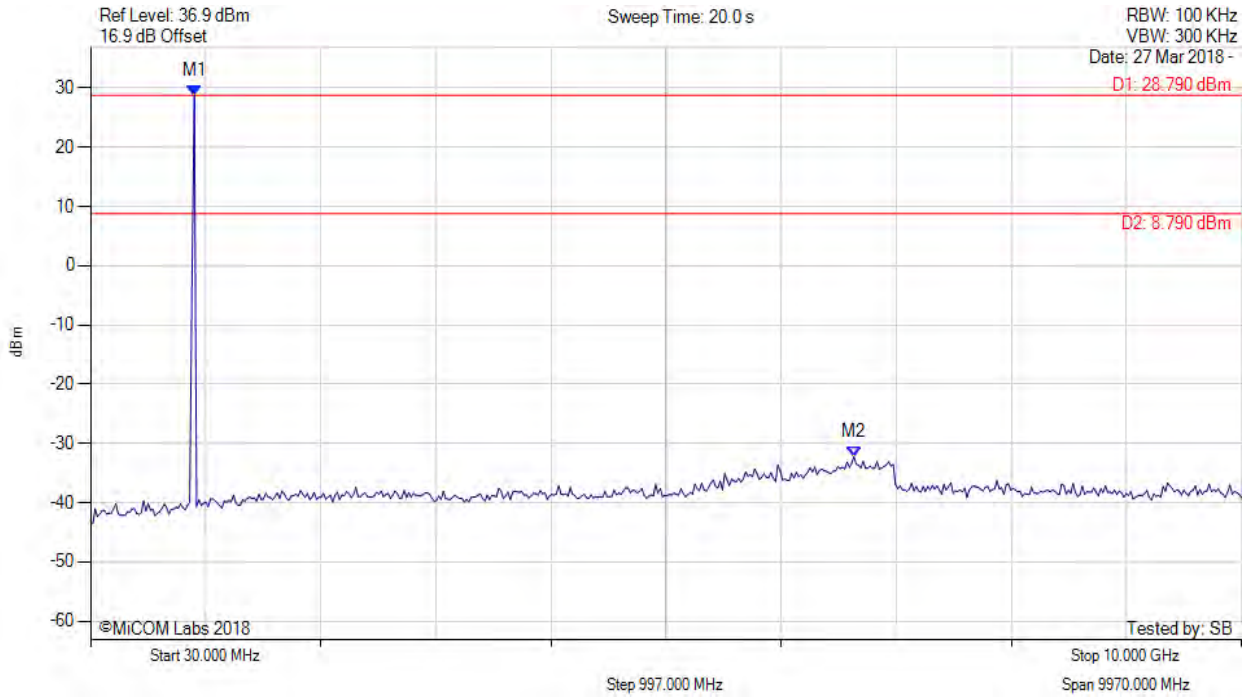


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 909.118 MHz : 29.337 dBm M2 : 6823.186 MHz : -32.211 dBm	Limit: 9.34 dBm Margin: -41.55 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

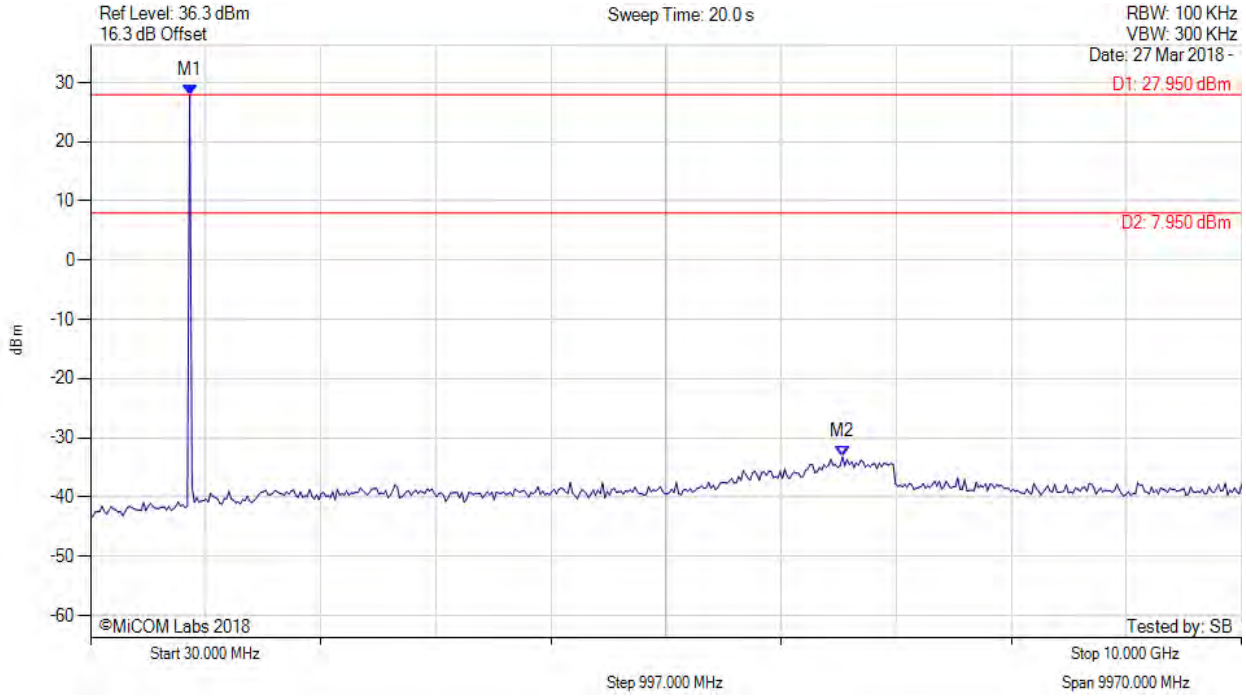


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 929.098 MHz : 28.791 dBm M2 : 6643.367 MHz : -32.239 dBm	Limit: 8.79 dBm Margin: -41.03 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

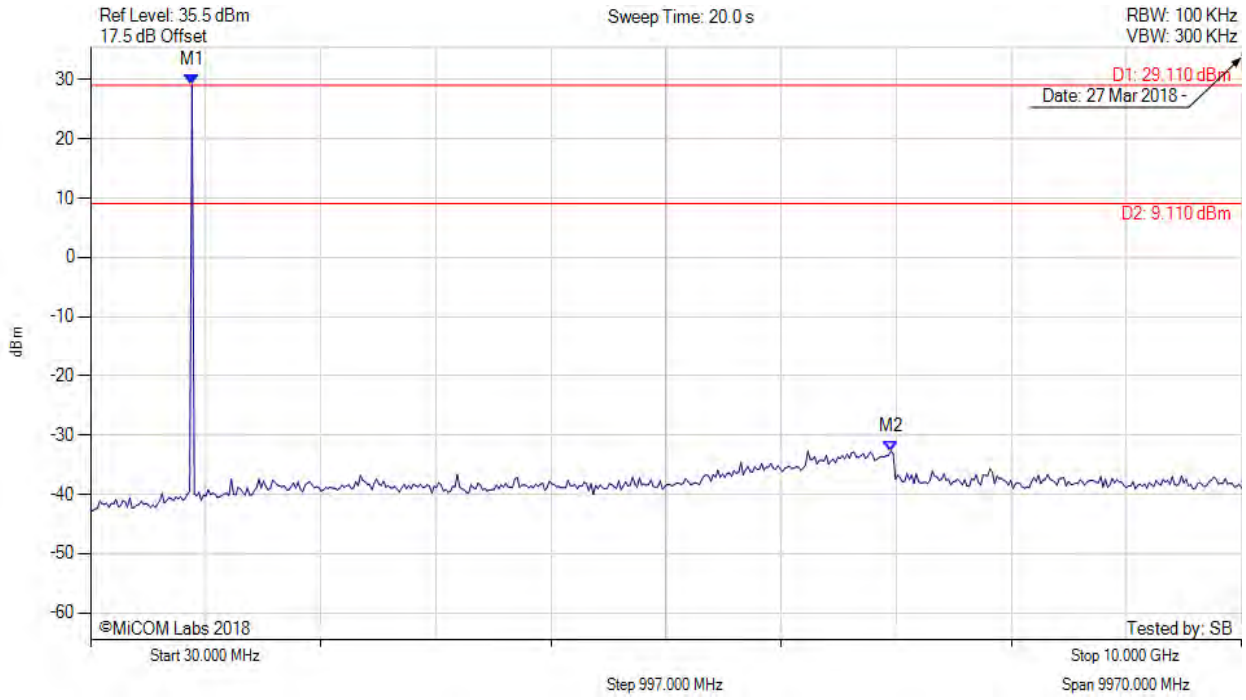


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 889.138 MHz : 27.949 dBm M2 : 6543.467 MHz : -33.187 dBm	Limit: 7.95 dBm Margin: -41.14 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 915.00 MHz, Chain a, Temp: 20, Voltage: Vdc

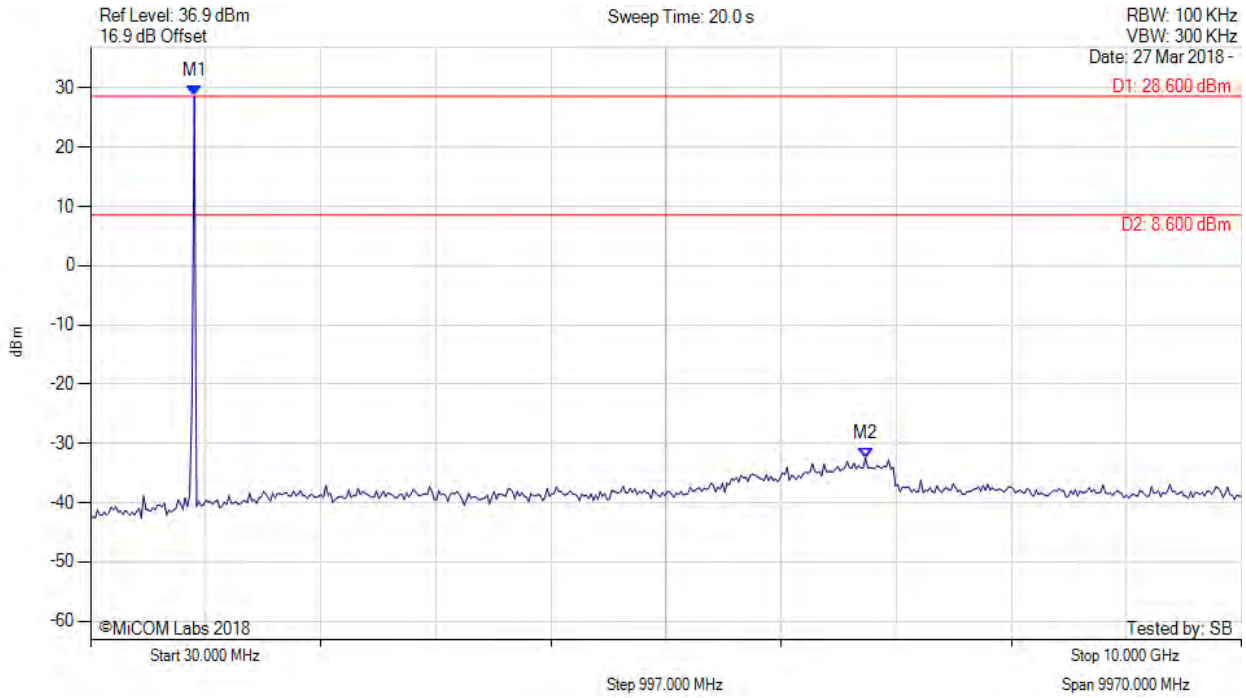


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 909.118 MHz : 29.108 dBm M2 : 6963.046 MHz : -32.685 dBm	Limit: 9.11 dBm Margin: -41.80 dB

back to matrix

UNWANTED EMISSIONS PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc



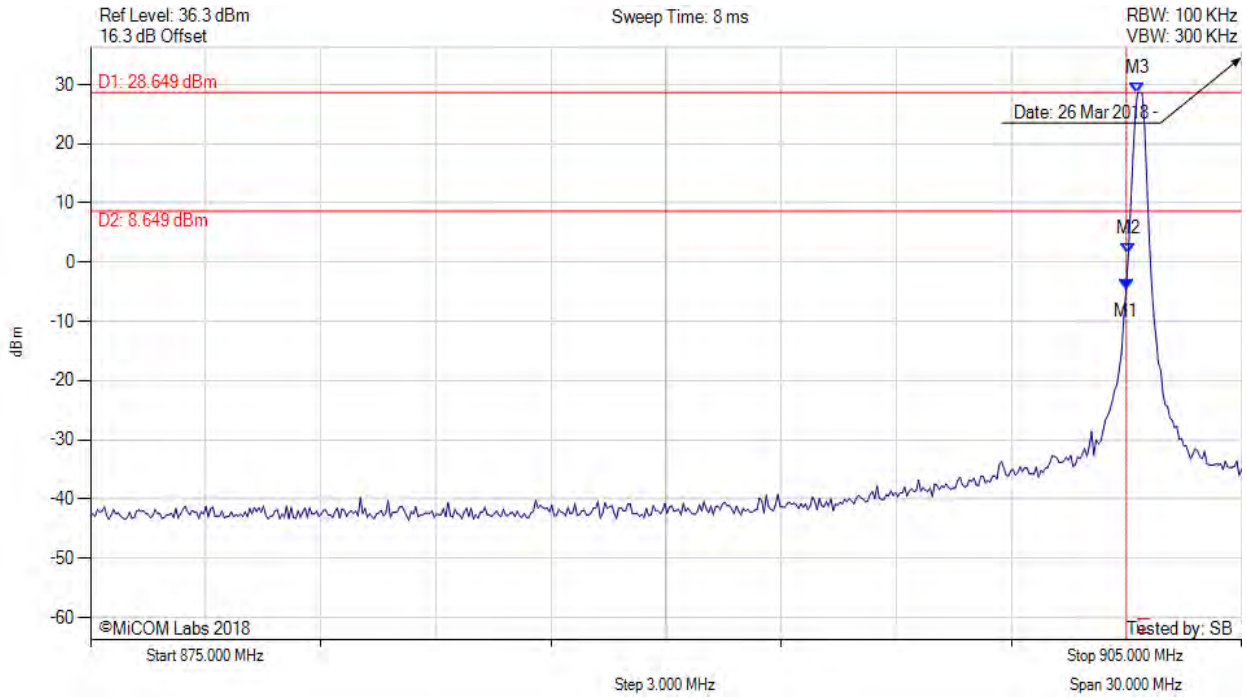
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 929.098 MHz : 28.600 dBm M2 : 6743.267 MHz : -32.473 dBm	Limit: 8.60 dBm Margin: -41.07 dB

back to matrix

A.3.1.2. Conducted Band-Edge Emissions

CONDUCTED LOW BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: 100.00 KBit/s, Channel: 902.30 MHz, Chain a, Temp: 20, Voltage: Vdc

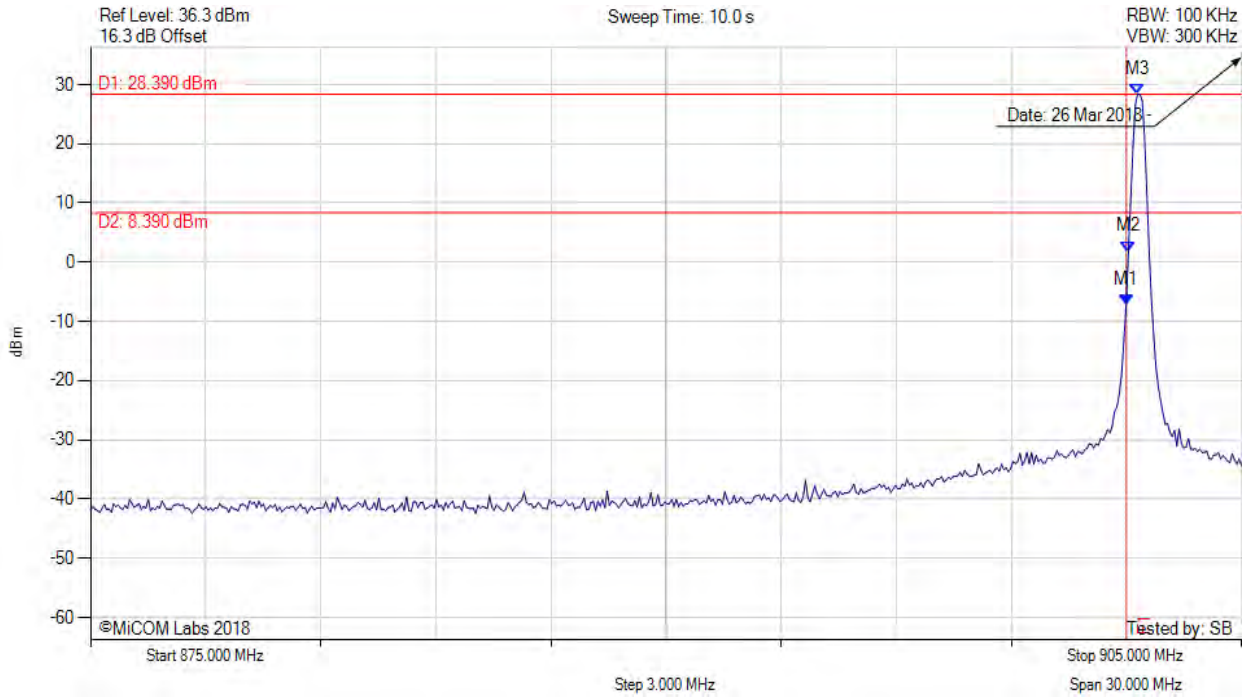


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.000 MHz : -4.688 dBm M2 : 902.054 MHz : 1.496 dBm M3 : 902.295 MHz : 28.649 dBm	Channel Frequency: 902.30 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: 100.00 KBit/s, Channel: 902.30 MHz, Chain a, Temp: 20, Voltage: Vdc

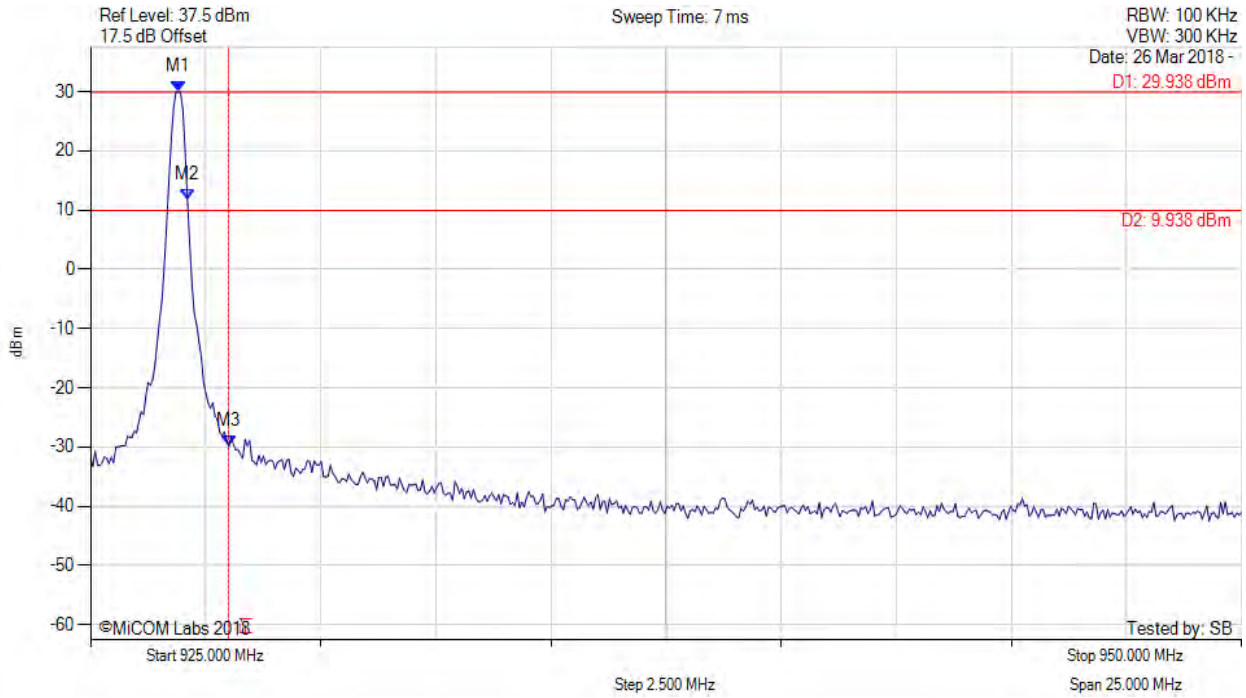


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.000 MHz : -7.179 dBm M2 : 902.054 MHz : 1.802 dBm M3 : 902.295 MHz : 28.393 dBm	Channel Frequency: 902.30 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: 100.00 KBit/s, Channel: 926.90 MHz, Chain a, Temp: 20, Voltage: Vdc

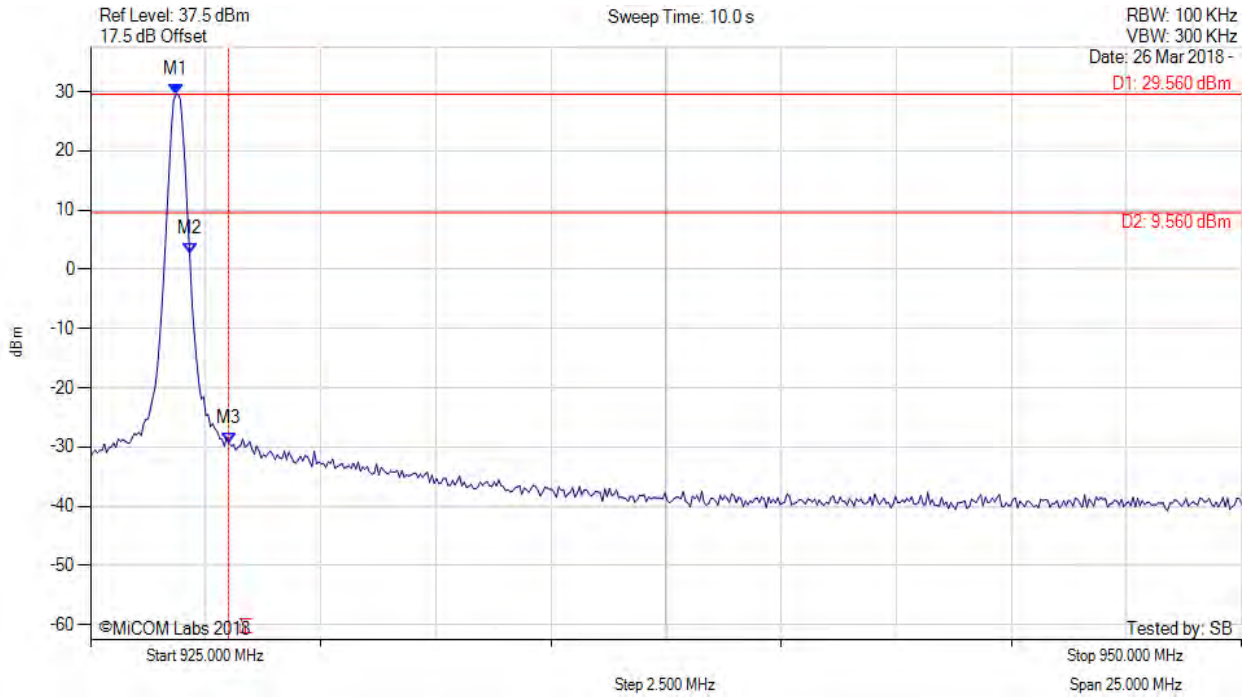


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 926.904 MHz : 29.938 dBm M2 : 927.104 MHz : 11.859 dBm M3 : 928.000 MHz : -29.874 dBm	Channel Frequency: 926.90 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: 100.00 KBit/s, Channel: 926.90 MHz, Chain a, Temp: 20, Voltage: Vdc

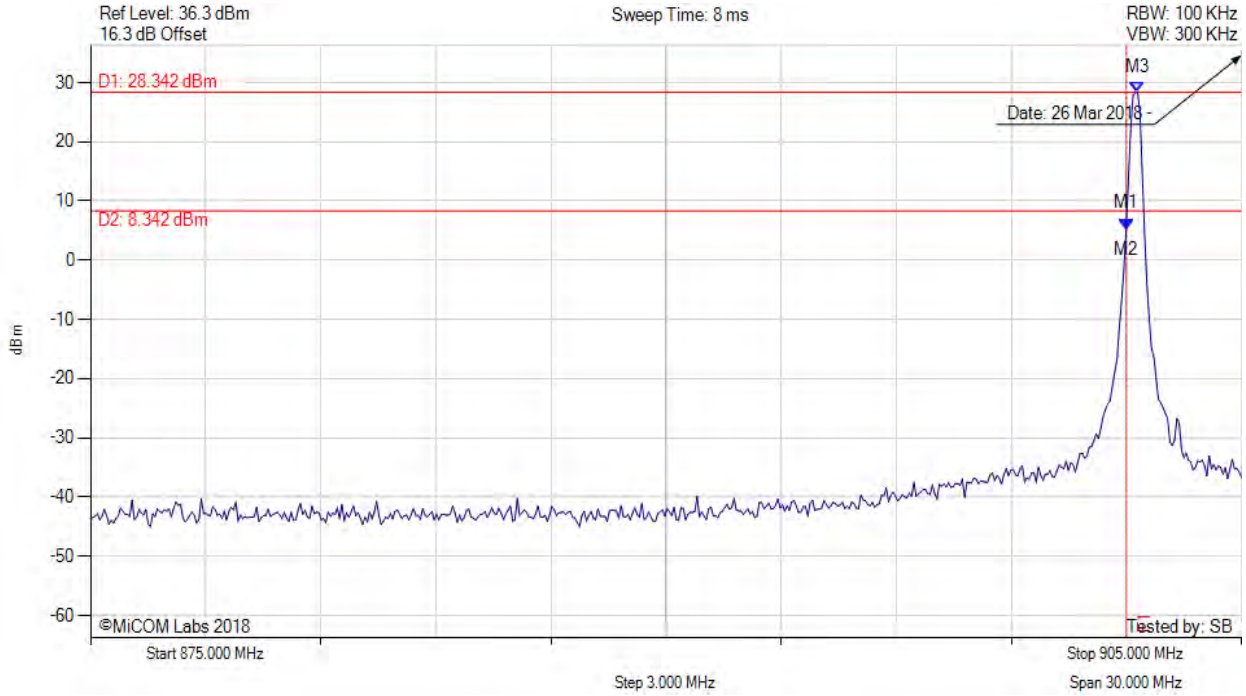


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 926.854 MHz : 29.562 dBm M2 : 927.154 MHz : 2.554 dBm M3 : 928.000 MHz : -29.327 dBm	Channel Frequency: 926.90 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: 50.00 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

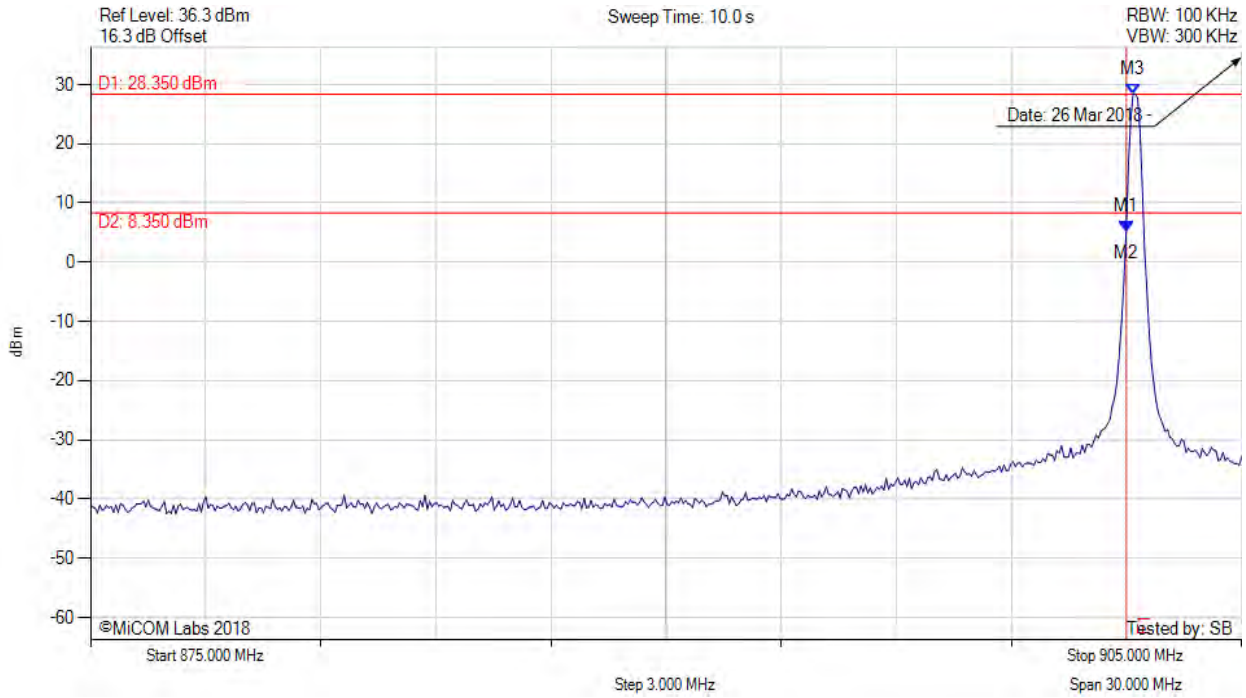


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.000 MHz : 5.300 dBm M2 : 901.994 MHz : 5.300 dBm M3 : 902.295 MHz : 28.342 dBm	Channel Frequency: 902.20 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: 50.00 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

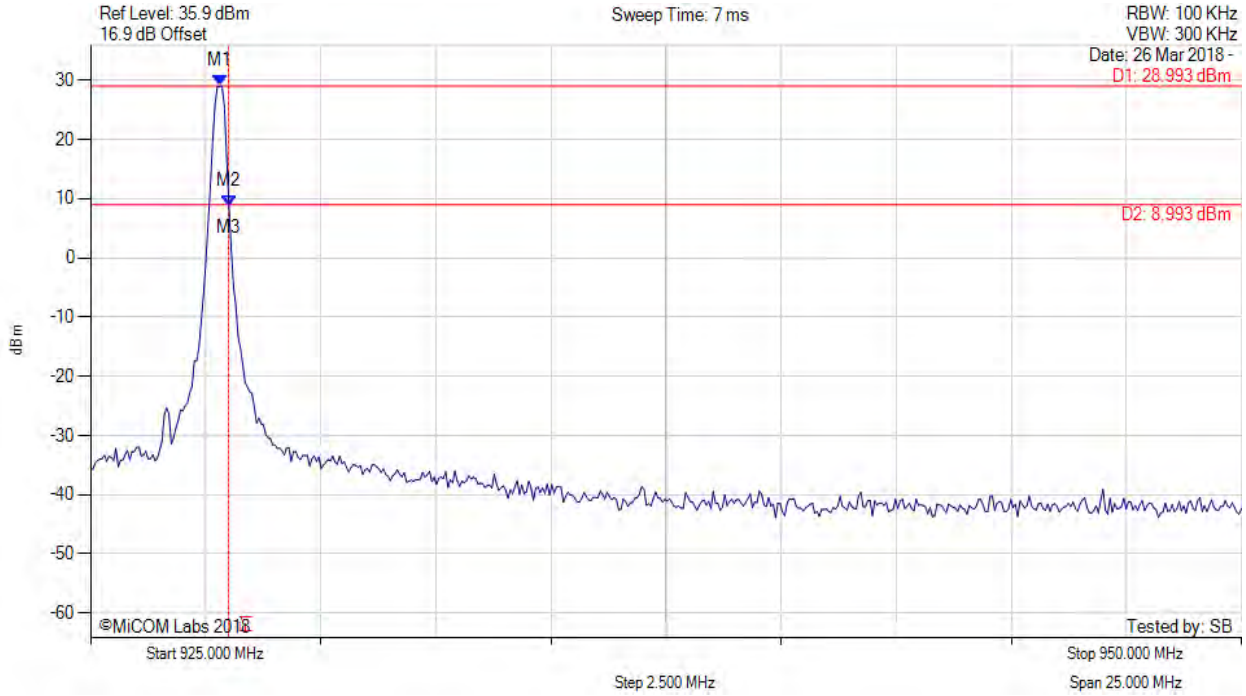


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.000 MHz : 5.115 dBm M2 : 901.994 MHz : 5.115 dBm M3 : 902.174 MHz : 28.354 dBm	Channel Frequency: 902.20 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: 50.00 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc

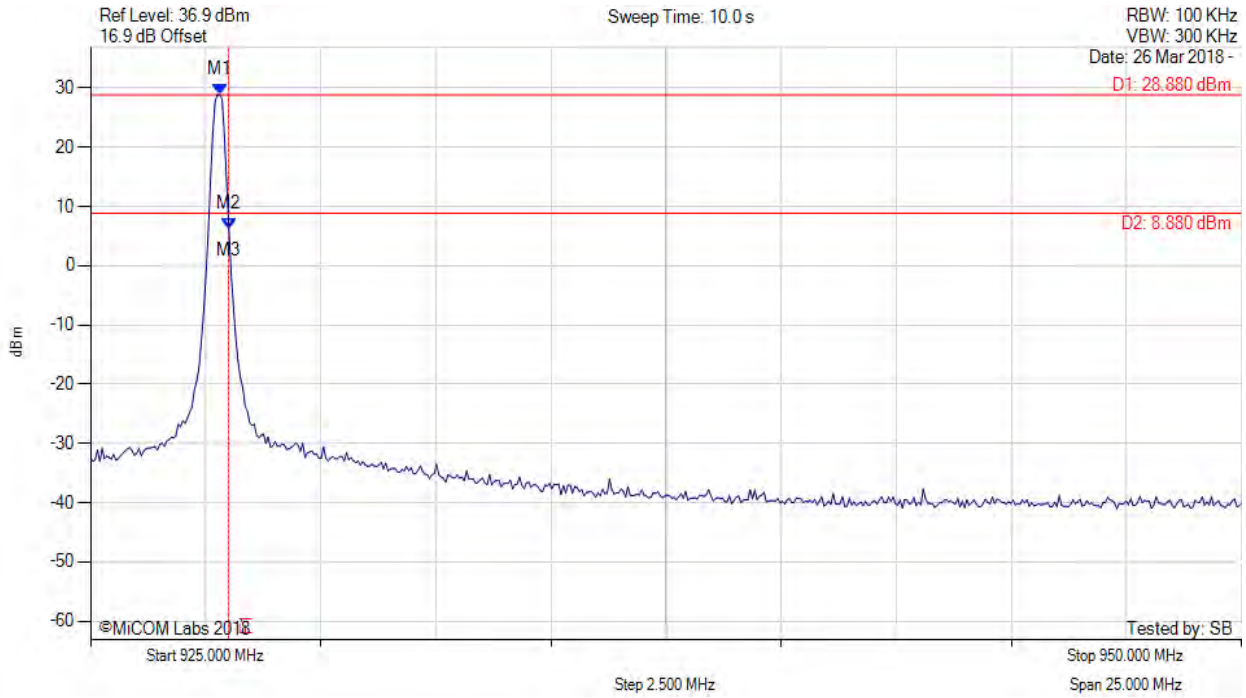


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 927.806 MHz : 28.993 dBm M2 : 928.006 MHz : 8.715 dBm M3 : 928.000 MHz : 8.715 dBm	Channel Frequency: 927.80 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: 50.00 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc

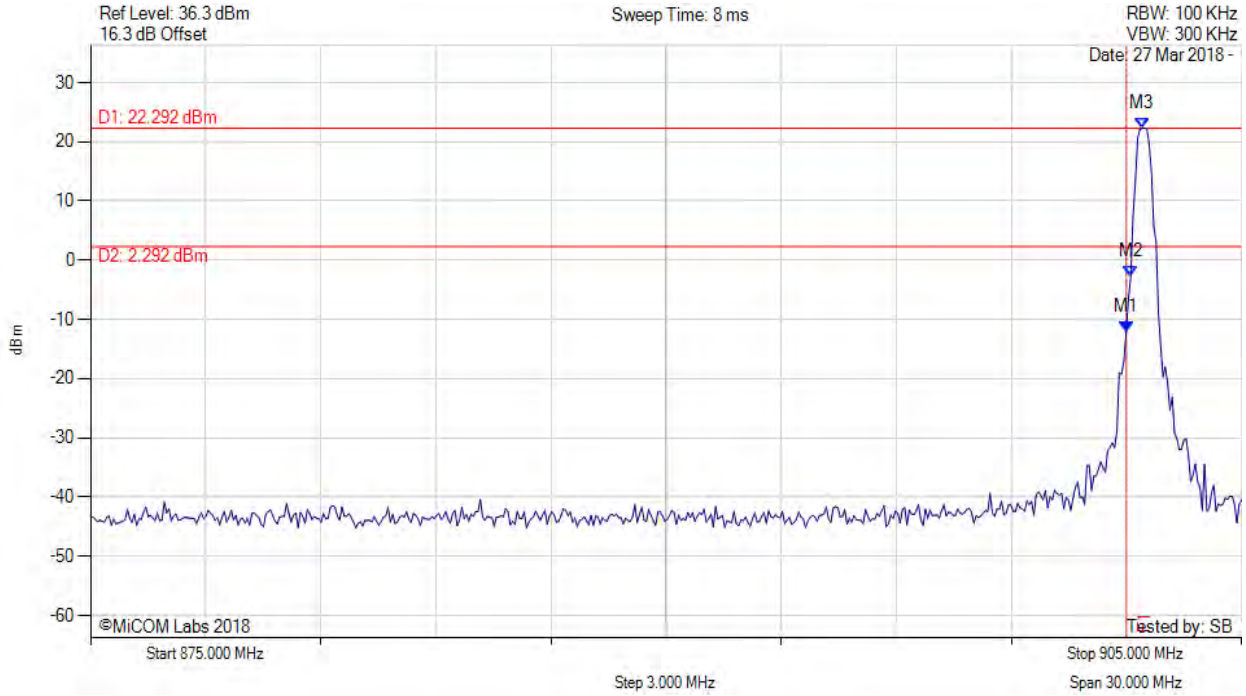


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.806 MHz : 28.881 dBm M2 : 928.006 MHz : 6.156 dBm M3 : 928.000 MHz : 6.156 dBm	Channel Frequency: 927.80 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: 600.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

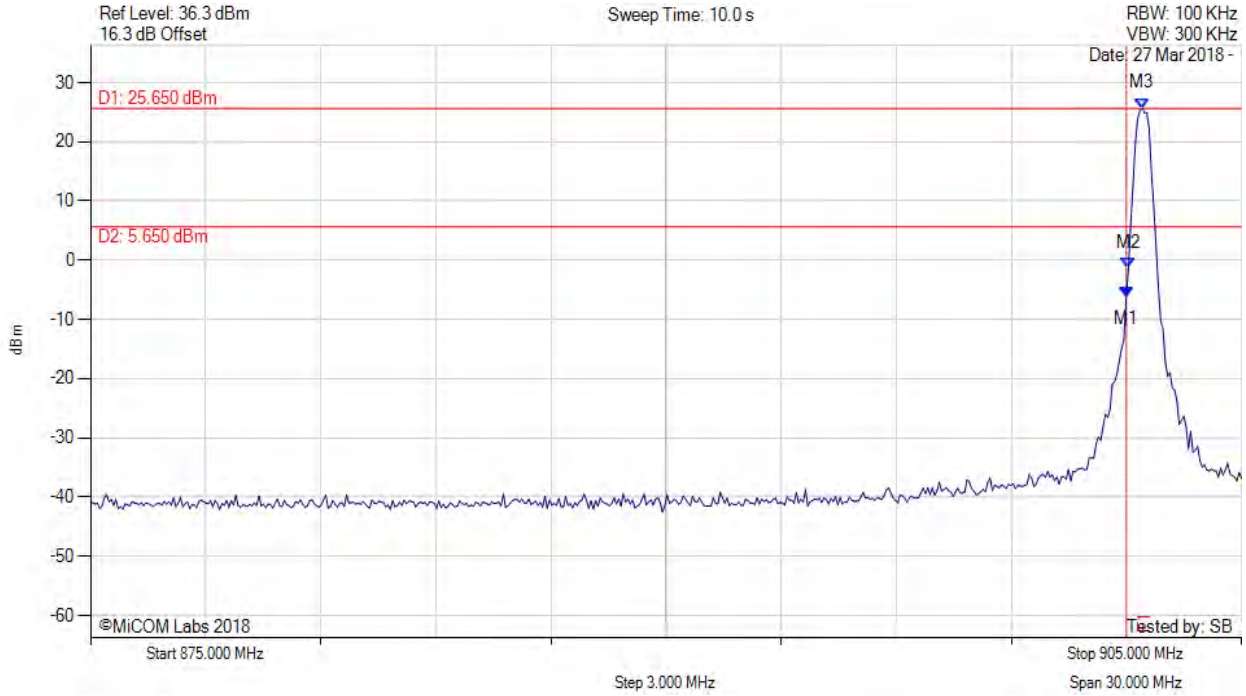


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.000 MHz : -12.123 dBm M2 : 902.114 MHz : -2.705 dBm M3 : 902.415 MHz : 22.292 dBm	Channel Frequency: 902.40 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: 600.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

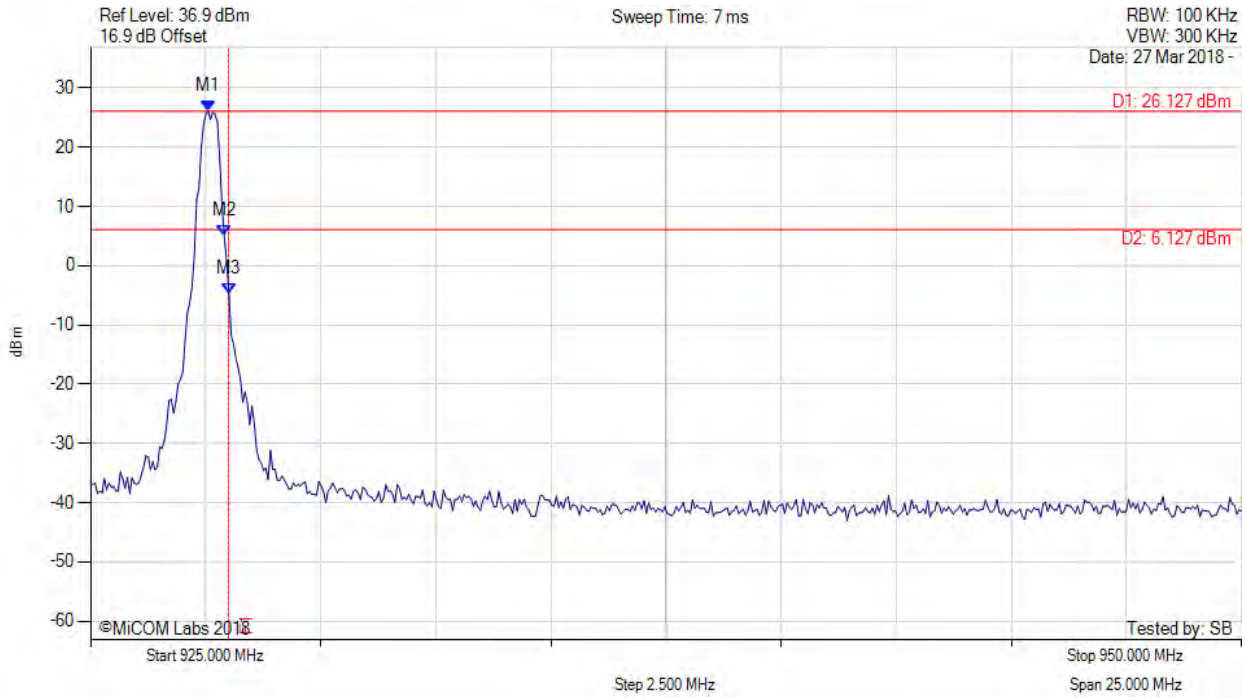


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.000 MHz : -6.234 dBm M2 : 902.054 MHz : -1.444 dBm M3 : 902.415 MHz : 25.649 dBm	Channel Frequency: 902.40 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: 600.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

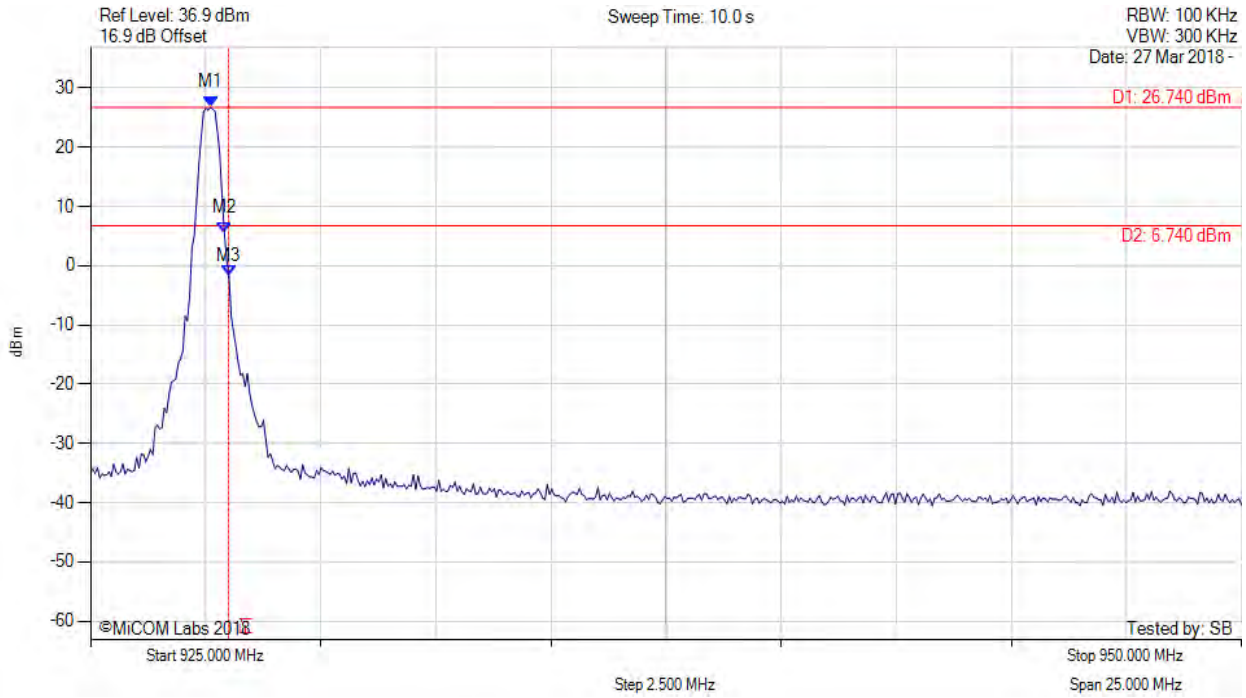


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 927.555 MHz : 26.127 dBm M2 : 927.906 MHz : 4.988 dBm M3 : 928.000 MHz : -4.700 dBm	Channel Frequency: 927.60 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: 600.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

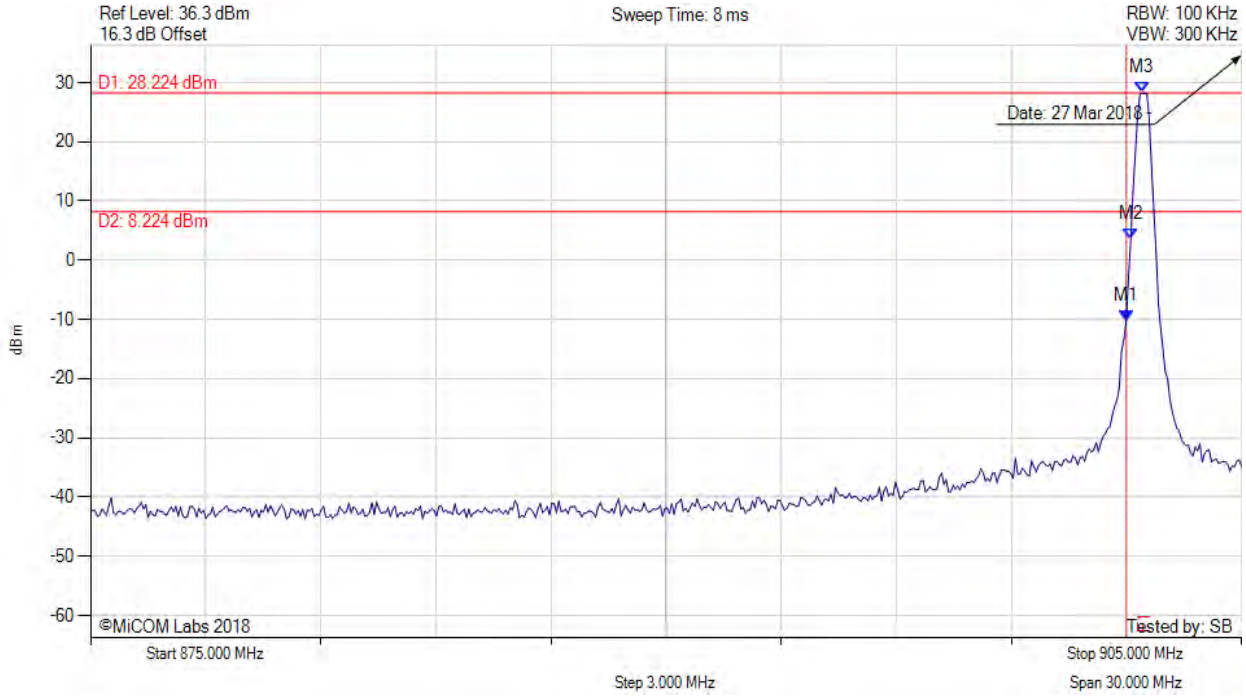


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.605 MHz : 26.735 dBm M2 : 927.906 MHz : 5.635 dBm M3 : 928.000 MHz : -1.772 dBm	Channel Frequency: 927.60 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

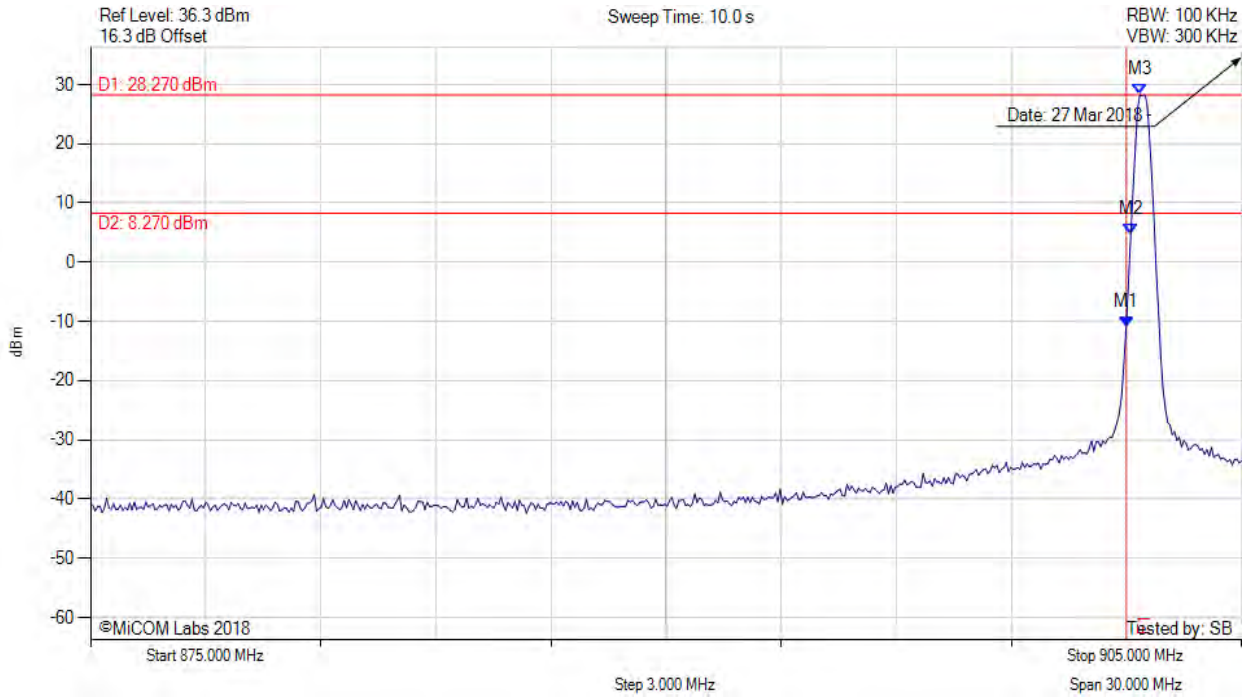


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.000 MHz : -10.318 dBm M2 : 902.114 MHz : 3.532 dBm M3 : 902.415 MHz : 28.224 dBm	Channel Frequency: 902.40 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 902.40 MHz, Chain a, Temp: 20, Voltage: Vdc

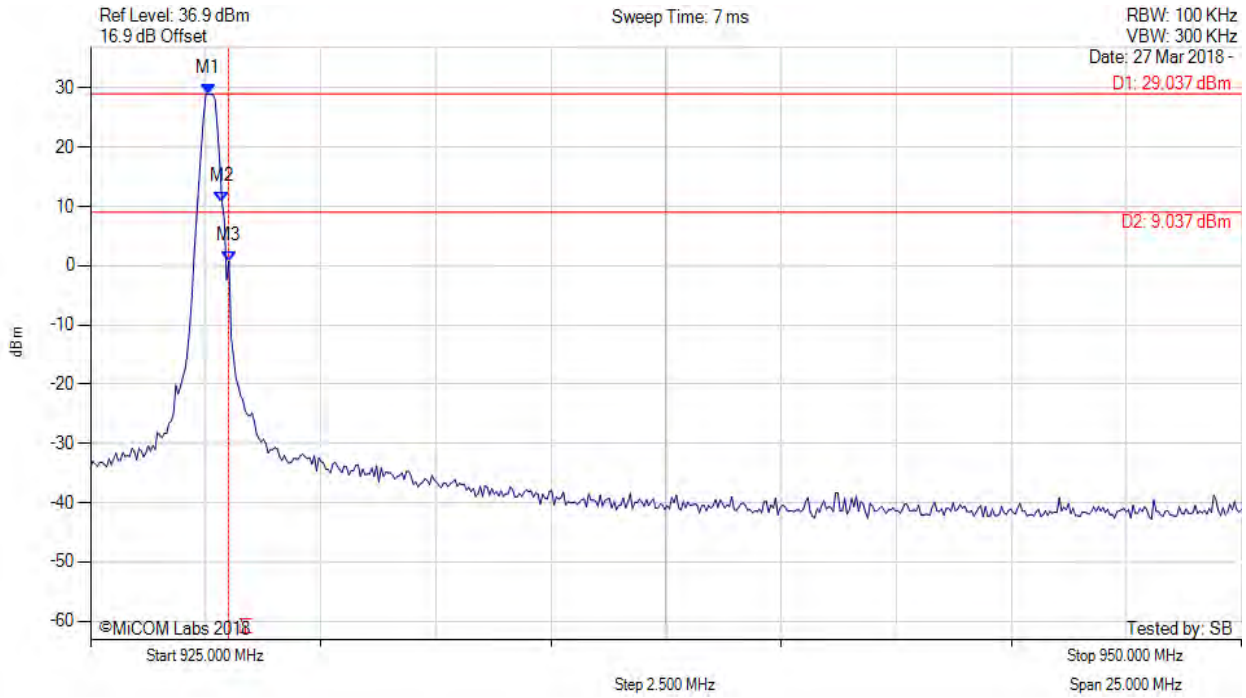


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.000 MHz : -10.942 dBm M2 : 902.114 MHz : 4.681 dBm M3 : 902.355 MHz : 28.275 dBm	Channel Frequency: 902.40 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

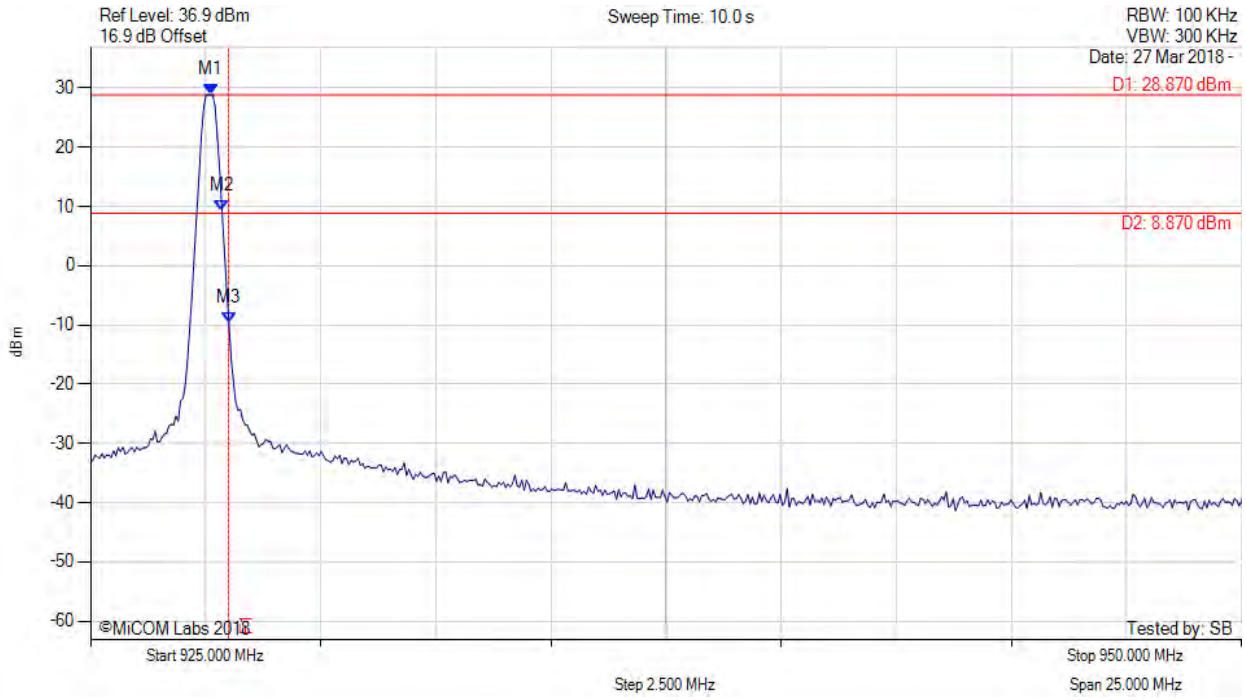


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 927.555 MHz : 29.037 dBm M2 : 927.856 MHz : 10.805 dBm M3 : 928.000 MHz : 0.760 dBm	Channel Frequency: 927.60 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: OQPSK 25.00 KBit/s, Channel: 927.60 MHz, Chain a, Temp: 20, Voltage: Vdc

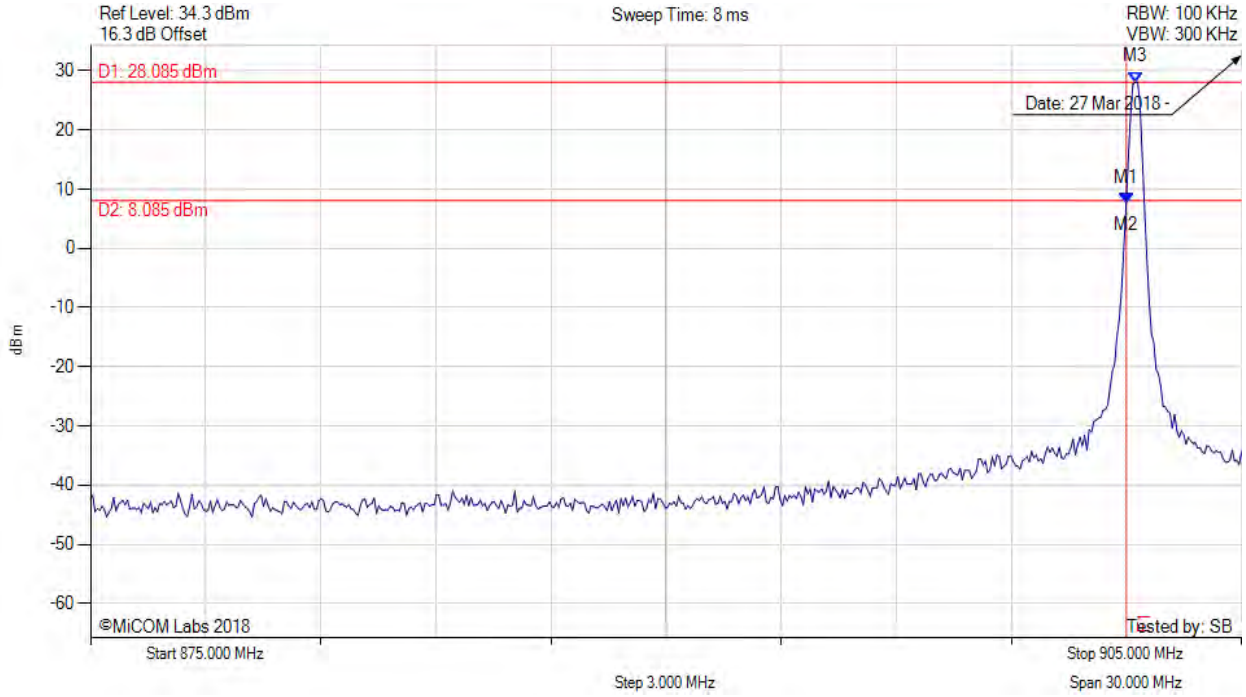


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.605 MHz : 28.875 dBm M2 : 927.856 MHz : 9.233 dBm M3 : 928.000 MHz : -9.683 dBm	Channel Frequency: 927.60 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

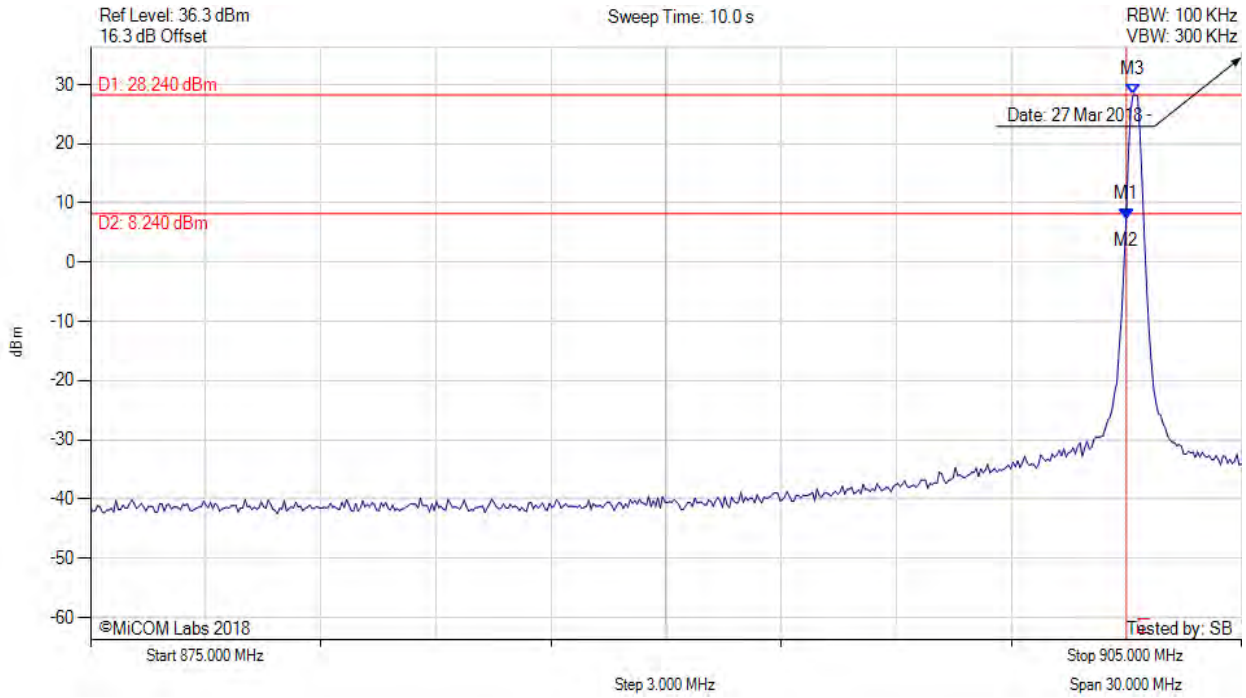


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 902.000 MHz : 7.627 dBm M2 : 901.994 MHz : 7.627 dBm M3 : 902.234 MHz : 28.085 dBm	Channel Frequency: 902.20 MHz

back to matrix

CONDUCTED LOW BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 902.20 MHz, Chain a, Temp: 20, Voltage: Vdc

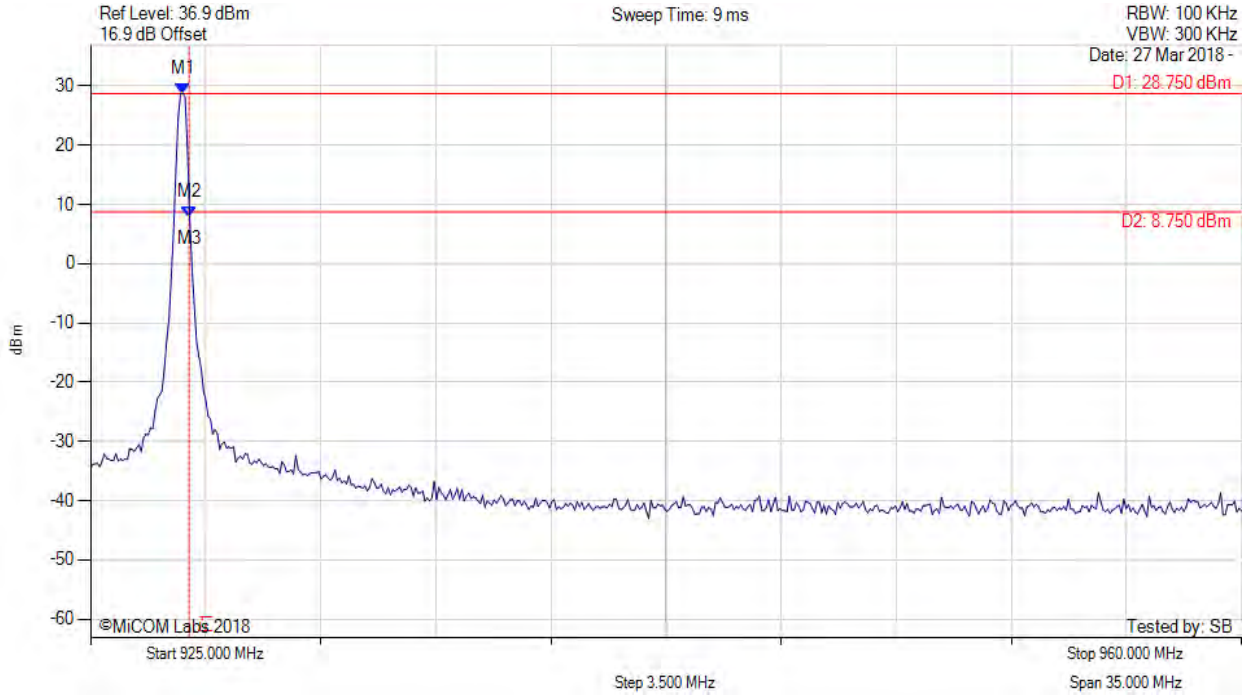


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.000 MHz : 7.315 dBm M2 : 901.994 MHz : 7.315 dBm M3 : 902.174 MHz : 28.236 dBm	Channel Frequency: 902.20 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (HOPPING) PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc

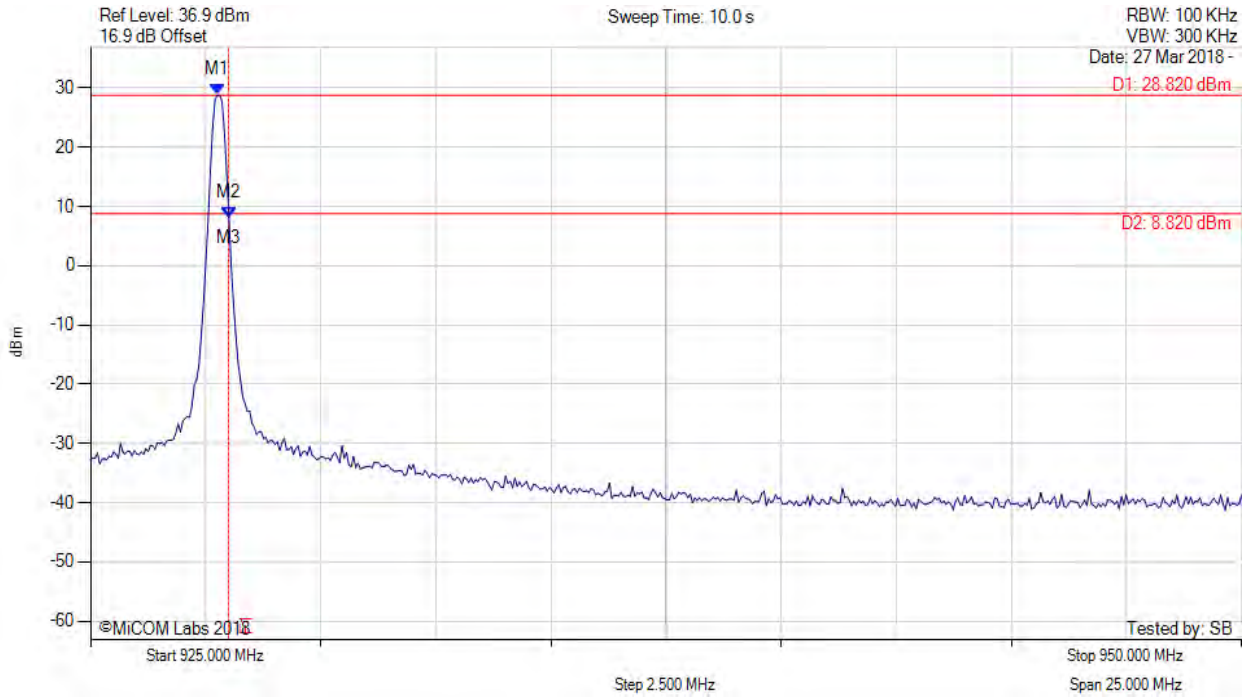


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = VIEW	M1 : 927.806 MHz : 28.755 dBm M2 : 928.000 MHz : 7.893 dBm M3 : 928.000 MHz : 7.893 dBm	Channel Frequency: 927.80 MHz

back to matrix

CONDUCTED UPPER BAND-EDGE EMISSIONS (STATIC) PEAK

Variant: OQPSK 6.25 KBit/s, Channel: 927.80 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 927.756 MHz : 28.822 dBm M2 : 928.006 MHz : 8.175 dBm M3 : 928.000 MHz : 8.175 dBm	Channel Frequency: 927.80 MHz

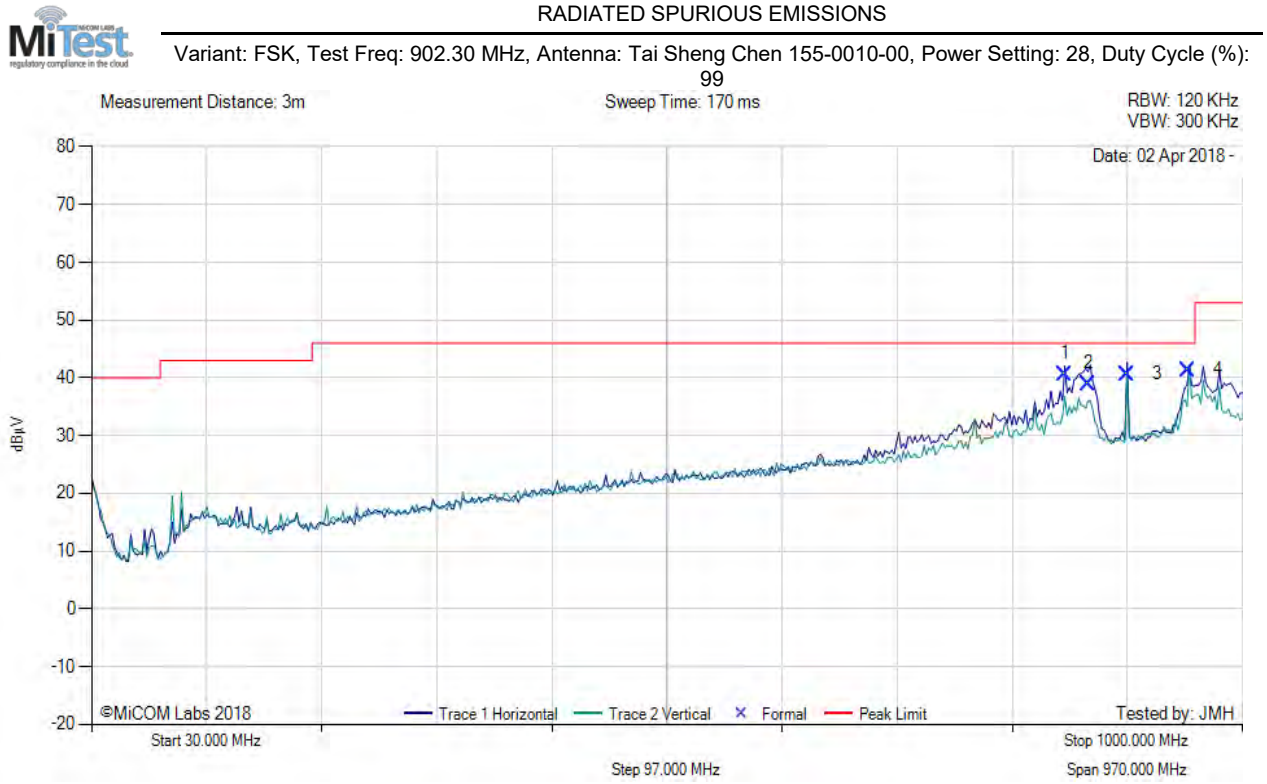
back to matrix

A.3.2. Radiated Emissions

A.3.2.3. TX Spurious & Restricted Band Emissions

Integral Antenna (Tai Sheng Chen 155-0010-00)

30-1000 MHz



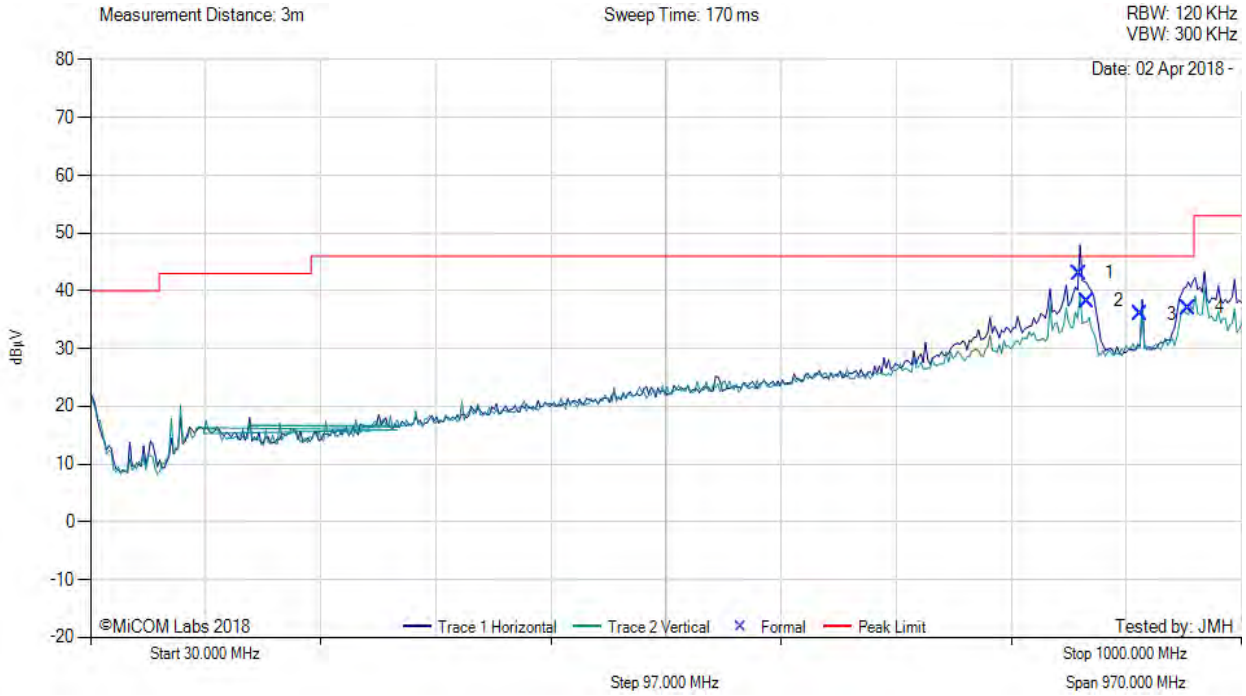
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	850.28	42.86	6.11	-8.30	40.67	MaxQP	Horizontal	98	285	46.0	-5.3	Pass
2	870.31	40.91	6.17	-8.10	38.98	MaxQP	Horizontal	108	284	46.0	-7.0	Pass
3	902.30	42.37	6.24	-8.00	40.61	Fundamental	Horizontal	100	0	--	--	
4	954.34	42.27	6.37	-7.27	41.37	MaxQP	Horizontal	221	335	46.0	-4.6	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.

back to matrix

RADIATED SPURIOUS EMISSIONS

Variant: FSK, Test Freq: 915.20 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99



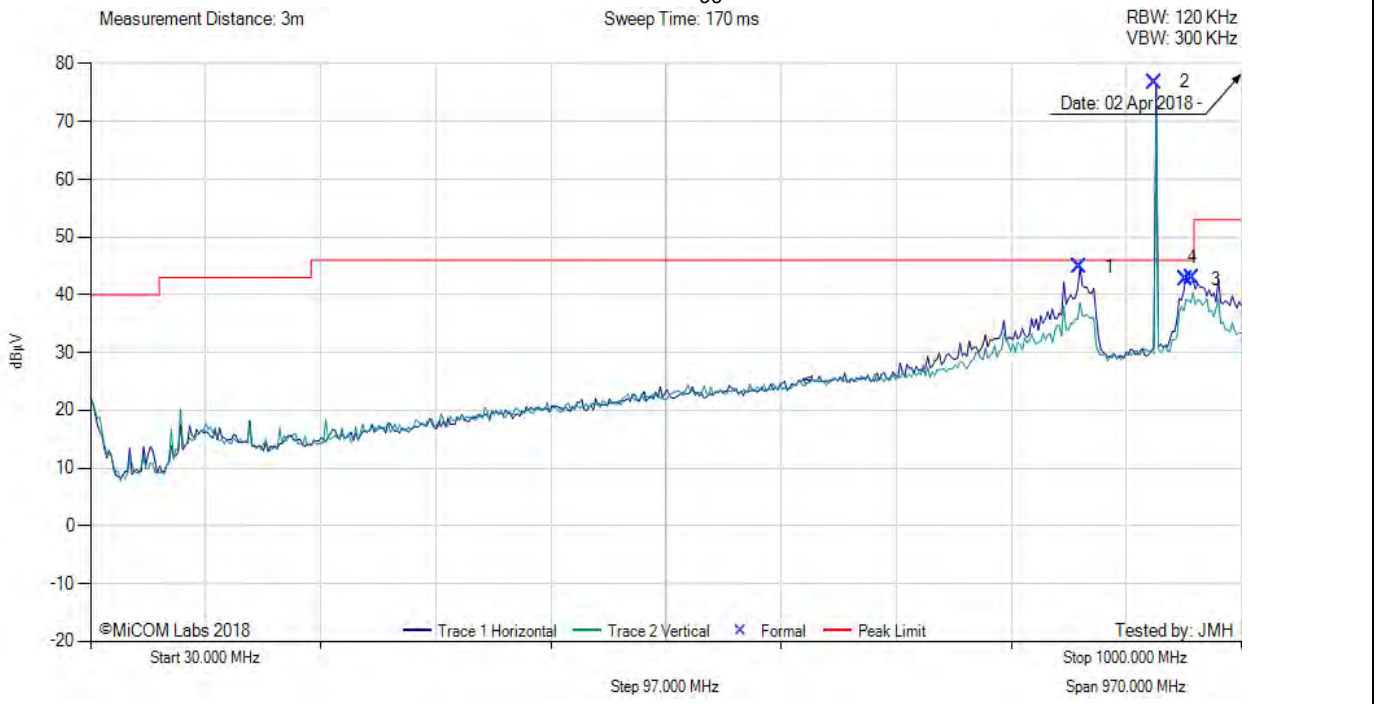
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	863.24	45.09	6.13	-8.14	43.08	MaxQP	Horizontal	98	286	46.0	-2.9	Pass
2	870.29	40.15	6.17	-8.10	38.22	MaxQP	Horizontal	98	290	46.0	-7.8	Pass
3	915.20	37.52	6.25	-7.82	35.95	Fundamental	Horizontal	100	0	--	--	
4	955.52	37.85	6.37	-7.17	37.05	MaxQP	Horizontal	217	338	46.0	-9.0	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.

back to matrix

RADIATED SPURIOUS EMISSIONS

Variant: FSK, Test Freq: 926.90 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99



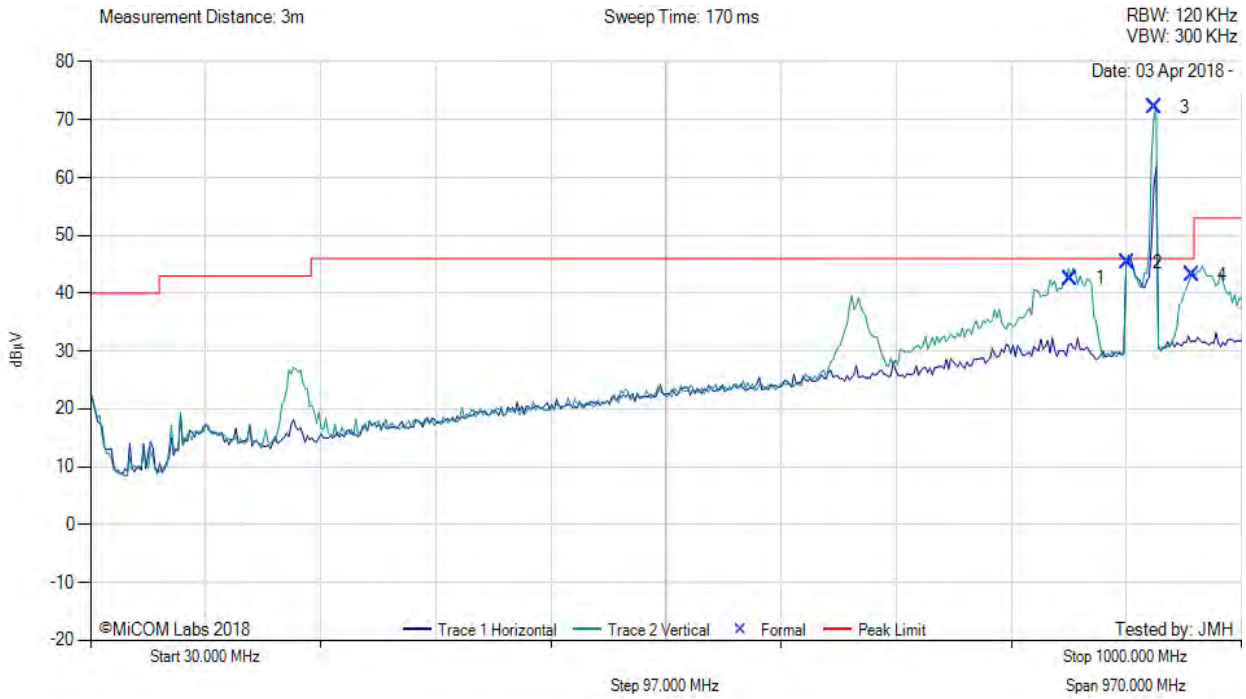
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	862.89	46.86	6.14	-8.15	44.85	MaxQP	Horizontal	98	283	46.0	-1.2	Pass
2	926.92	78.18	6.28	-7.64	76.82	Fundamental	Horizontal	100	0	--	--	
3	952.86	43.50	6.37	-7.26	42.61	MaxQP	Horizontal	218	346	46.0	-3.4	Pass
4	958.87	43.86	6.39	-7.28	42.97	MaxQP	Horizontal	157	348	46.0	-3.0	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.

back to matrix

RADIATED EMISSIONS

Variant: FSK, Test Freq: Hopping, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99



30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	855.95	44.67	6.11	-8.23	42.55	Peak (NRB)	Vertical	100	0	--	--	Pass
2	903.55	46.83	6.23	-7.81	45.25	Peak (NRB)	Vertical	100	0	--	--	Pass
3	926.37	73.58	6.28	-7.64	72.22	Peak (NRB)	Vertical	100	0	--	--	Pass
4	958.78	44.07	6.39	-7.28	43.18	Peak (NRB)	Vertical	100	0	--	--	Pass

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

back to matrix

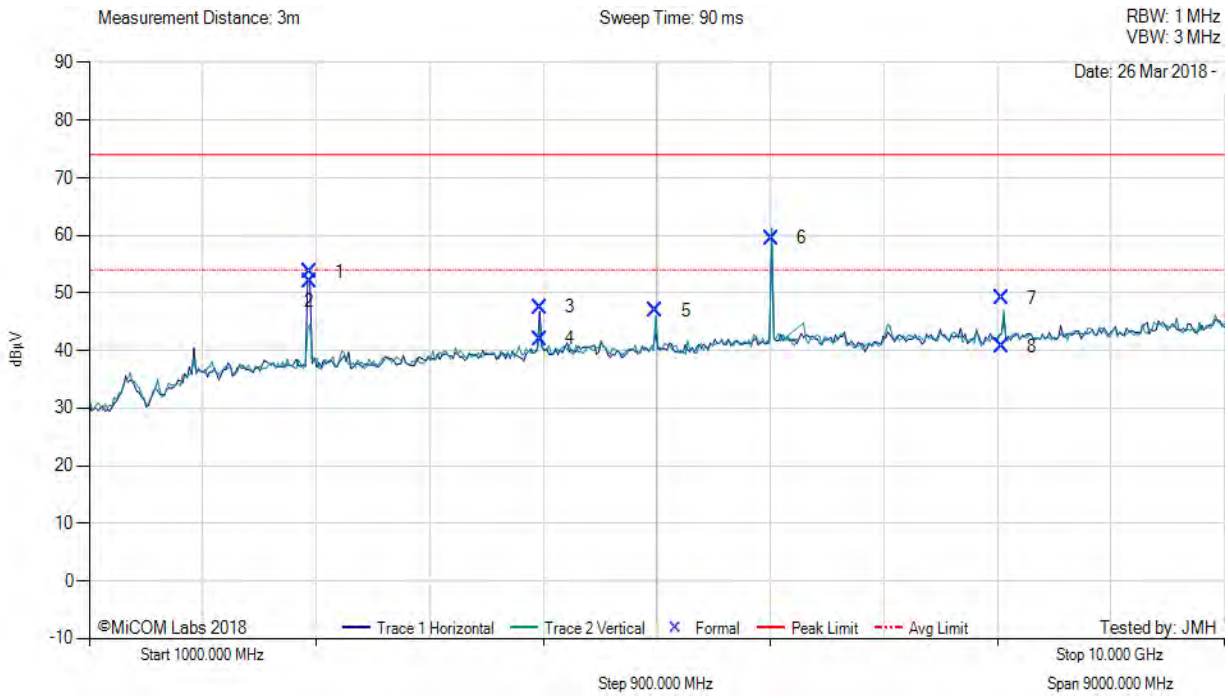
Variant: FHSS, Test Freq: 902.30 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	2706.89	62.63	2.35	-11.97	53.01	Max Peak	Horizontal	99	319	74.0	-21.0	Pass
2	2706.89	61.08	2.35	-11.97	51.46	Max Avg	Horizontal	99	319	54.0	-2.5	Pass
3	5413.82	55.47	3.15	-11.79	46.83	Max Peak	Vertical	188	353	74.0	-27.2	Pass
4	5413.82	49.01	3.15	-11.79	40.37	Max Avg	Vertical	188	353	54.0	-13.6	Pass
5	6316.28	63.48	3.27	-9.12	57.63	Peak (NRB)	Vertical	100	0	--	--	Pass

Test Notes: EUT powered by 4 volt DC

back to matrix

Variant: FHSS, Test Freq: 915.20 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99

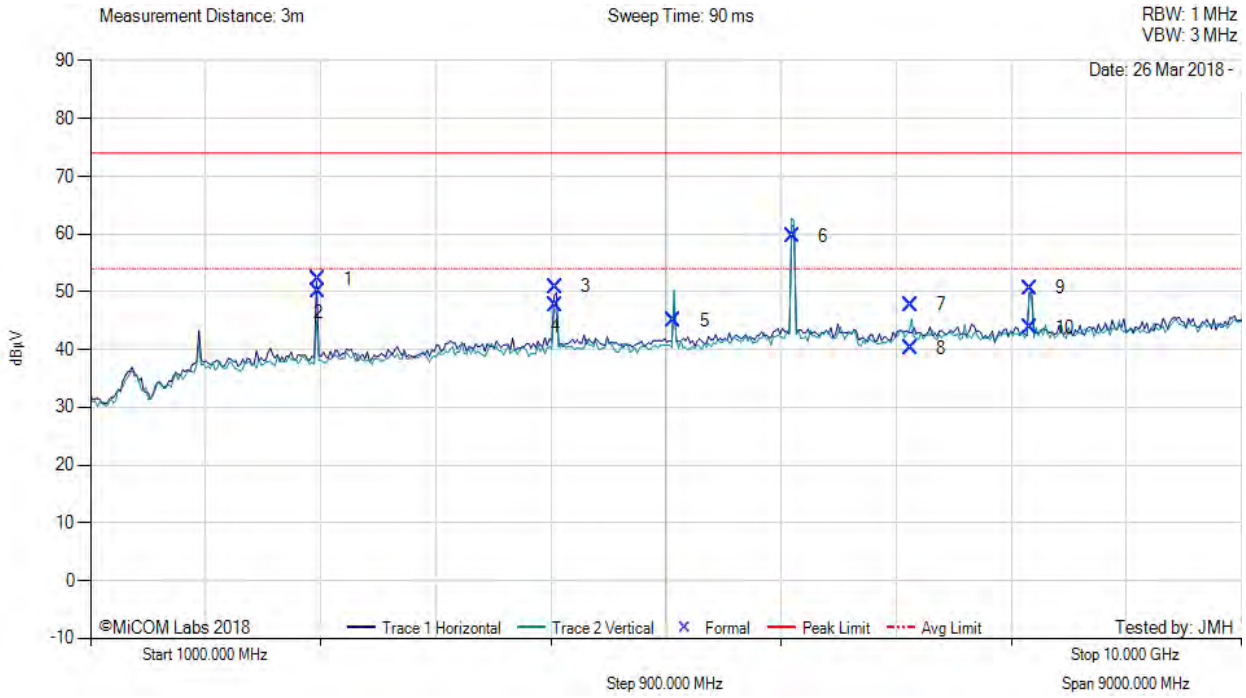


1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	2745.59	63.14	2.39	-11.96	53.57	Max Peak	Horizontal	105	320	74.0	-20.4	Pass
2	2745.59	61.65	2.39	-11.96	52.08	Max Avg	Horizontal	105	320	54.0	-1.9	Pass
3	4576.21	56.65	2.93	-12.01	47.57	Max Peak	Horizontal	101	138	74.0	-26.4	Pass
4	4576.21	51.08	2.93	-12.01	42.00	Max Avg	Horizontal	101	138	54.0	-12.0	Pass
5	5491.38	55.23	3.17	-11.50	46.90	Peak (NRB)	Vertical	100	0	--	--	Pass
6	6406.20	65.55	3.18	-9.21	59.52	Peak (NRB)	Vertical	100	0	--	--	Pass
7	8237.12	52.43	3.96	-7.31	49.08	Max Peak	Vertical	194	220	74.0	-24.9	Pass
8	8237.12	44.05	3.96	-7.31	40.70	Max Avg	Vertical	194	220	54.0	-13.3	Pass

Test Notes: EUT powered by 4 volt DC

back to matrix

Variant: FHSS, Test Freq: 926.90 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99



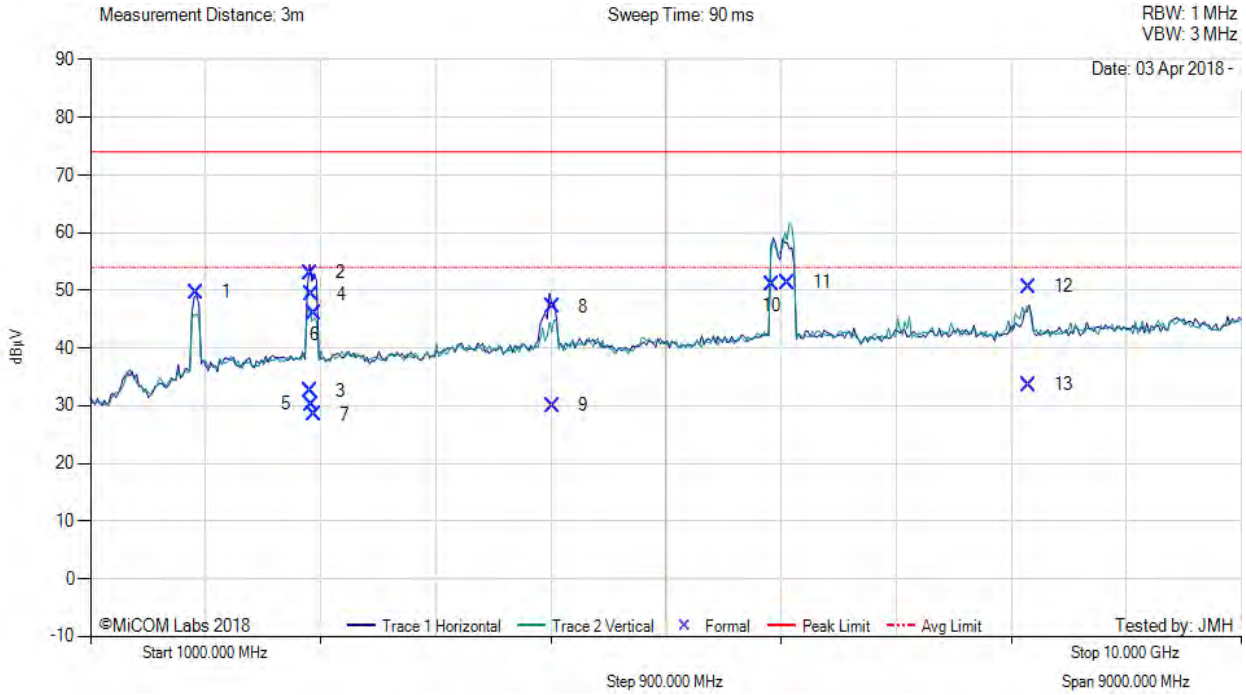
1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	2780.71	61.78	2.40	-11.93	52.25	Max Peak	Horizontal	101	317	74.0	-21.8	Pass
2	2780.71	59.53	2.40	-11.93	50.00	Max Avg	Horizontal	101	317	54.0	-4.0	Pass
3	4634.46	60.19	2.93	-12.23	50.89	Max Peak	Horizontal	100	108	74.0	-23.1	Pass
4	4634.46	57.01	2.93	-12.23	47.71	Max Avg	Horizontal	100	108	54.0	-6.3	Pass
5	5561.43	53.18	3.16	-11.30	45.04	Peak (NRB)	Vertical	100	90	--	--	Pass
6	6488.51	65.42	3.13	-8.96	59.59	Peak (NRB)	Vertical	100	0	--	--	Pass
7	7415.23	52.12	3.54	-7.93	47.73	Max Peak	Vertical	119	153	74.0	-26.3	Pass
8	7415.23	44.58	3.54	-7.93	40.19	Max Avg	Vertical	119	153	54.0	-13.8	Pass
9	8342.07	54.70	3.99	-8.08	50.61	Max Peak	Vertical	197	66	74.0	-23.4	Pass
10	8342.07	47.92	3.99	-8.08	43.83	Max Avg	Vertical	197	66	54.0	-10.2	Pass

Test Notes: EUT powered by 4 volt DC

back to matrix

TX SPURIOUS & RESTRICTED BAND EMISSIONS

Variant: FSK, Test Freq: Hopping, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 28, Duty Cycle (%): 99



1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	1823.32	61.78	2.01	-14.14	49.65	Peak (NRB)	Horizontal	100	0	--	--	Pass
2	2718.77	62.71	2.37	-12.06	53.02	Max Peak	Horizontal	183	321	74.0	-21.0	Pass
3	2718.77	42.26	2.37	-12.06	32.57	Max Avg	Horizontal	183	321	54.0	-21.4	Pass
4	2731.10	59.02	2.38	-12.06	49.34	Max Peak	Horizontal	168	157	74.0	-24.7	Pass
5	2731.10	39.96	2.38	-12.06	30.28	Max Avg	Horizontal	168	157	54.0	-23.7	Pass
6	2749.22	55.60	2.39	-11.95	46.04	Max Peak	Horizontal	138	101	74.0	-28.0	Pass
7	2749.22	38.09	2.39	-11.95	28.53	Max Avg	Horizontal	138	101	54.0	-25.5	Pass
8	4616.35	56.10	2.94	-11.91	47.13	Max Peak	Horizontal	113	300	74.0	-26.9	Pass
9	4616.35	39.00	2.94	-11.91	30.03	Max Avg	Horizontal	113	300	54.0	-24.0	Pass
10	6332.78	57.04	3.23	-9.29	50.98	Peak (NRB)	Horizontal	100	92	--	--	Pass
11	6450.22	57.36	3.14	-9.10	51.40	Peak (NRB)	Vertical	100	92	--	--	Pass
12	8336.66	54.80	3.98	-8.12	50.66	Max Peak	Horizontal	186	98	74.0	-23.3	Pass
13	8336.66	37.81	3.98	-8.12	33.67	Max Avg	Horizontal	186	98	54.0	-20.3	Pass

Test Notes: EUT powered by 4V DC. Hopping

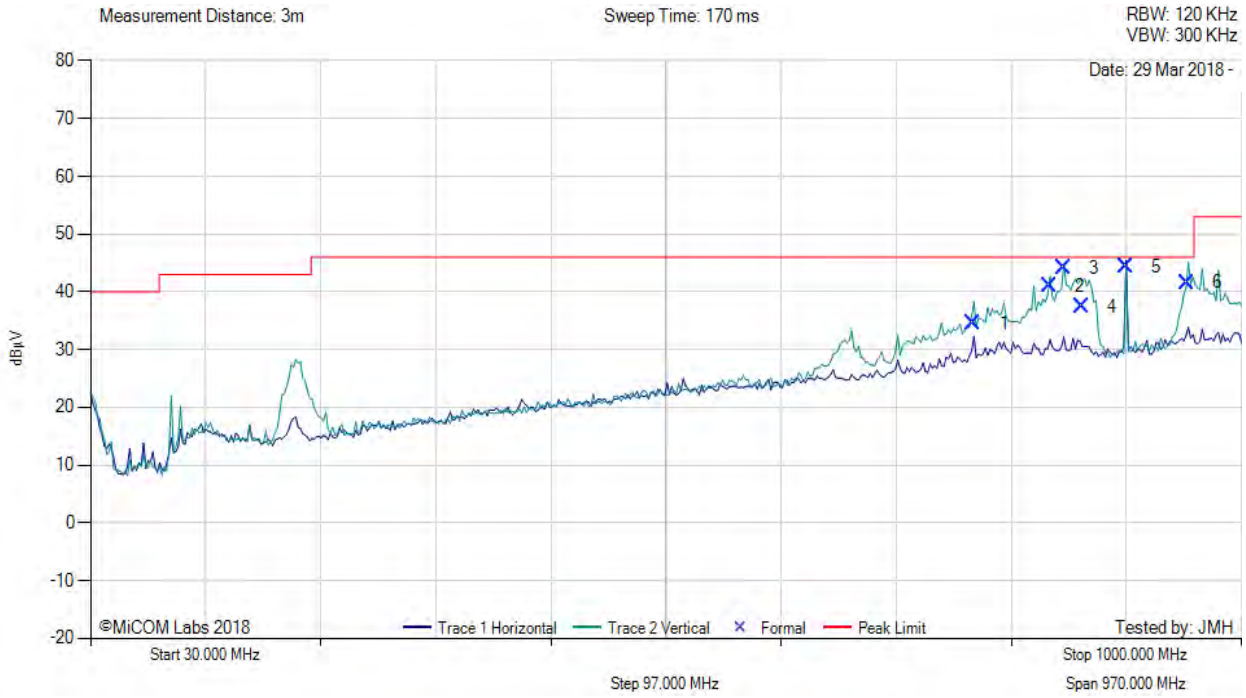
back to matrix

OMNI Antenna (WPANT30017-CA)

30-1000 MHz

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: 902.30 MHz, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99



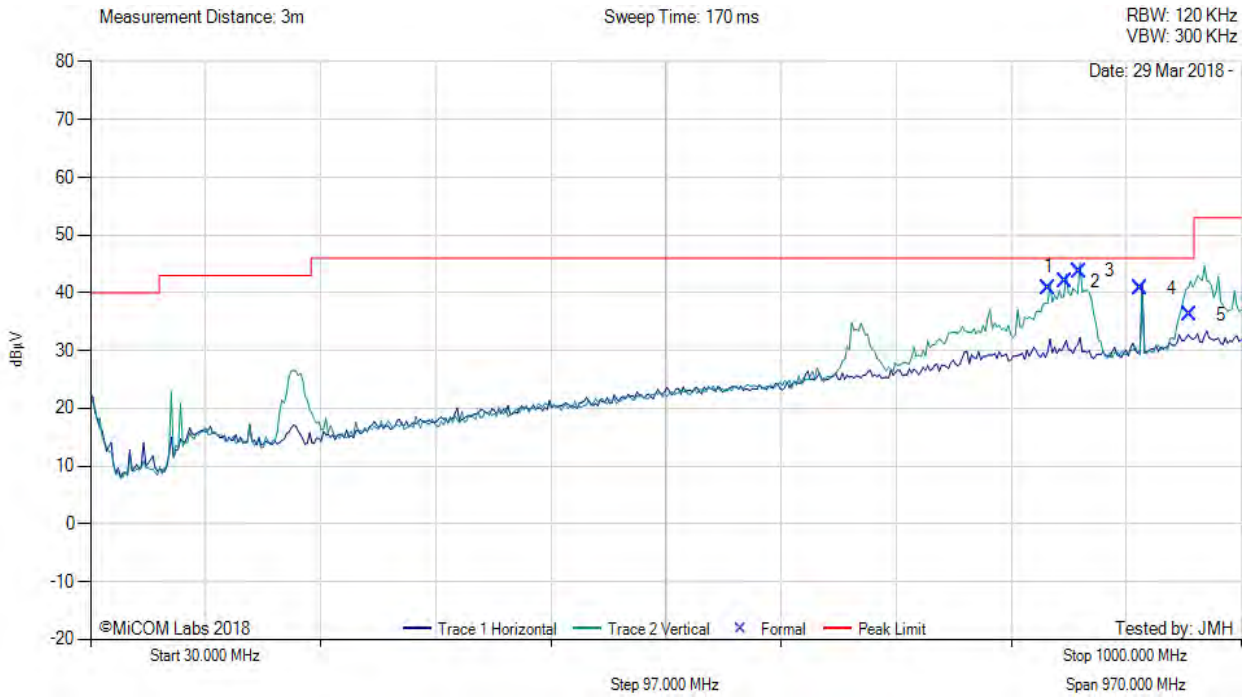
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	774.26	38.10	5.93	-9.45	34.58	MaxQP	Vertical	257	25	46.0	-11.4	Pass
2	838.25	43.34	6.06	-8.36	41.04	MaxQP	Vertical	152	156	46.0	-5.0	Pass
3	850.26	46.31	6.11	-8.30	44.12	MaxQP	Vertical	203	204	46.0	-1.9	Pass
4	865.18	39.27	6.13	-8.03	37.37	MaxQP	Vertical	152	187	46.0	-8.6	Pass
5	902.27	46.13	6.24	-8.00	44.37	Fundamental	Horizontal	100	0	--	--	
6	954.34	42.48	6.37	-7.27	41.58	MaxQP	Vertical	152	245	46.0	-4.4	Pass

Test Notes: EUT powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

back to matrix

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: 915.20 MHz, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99



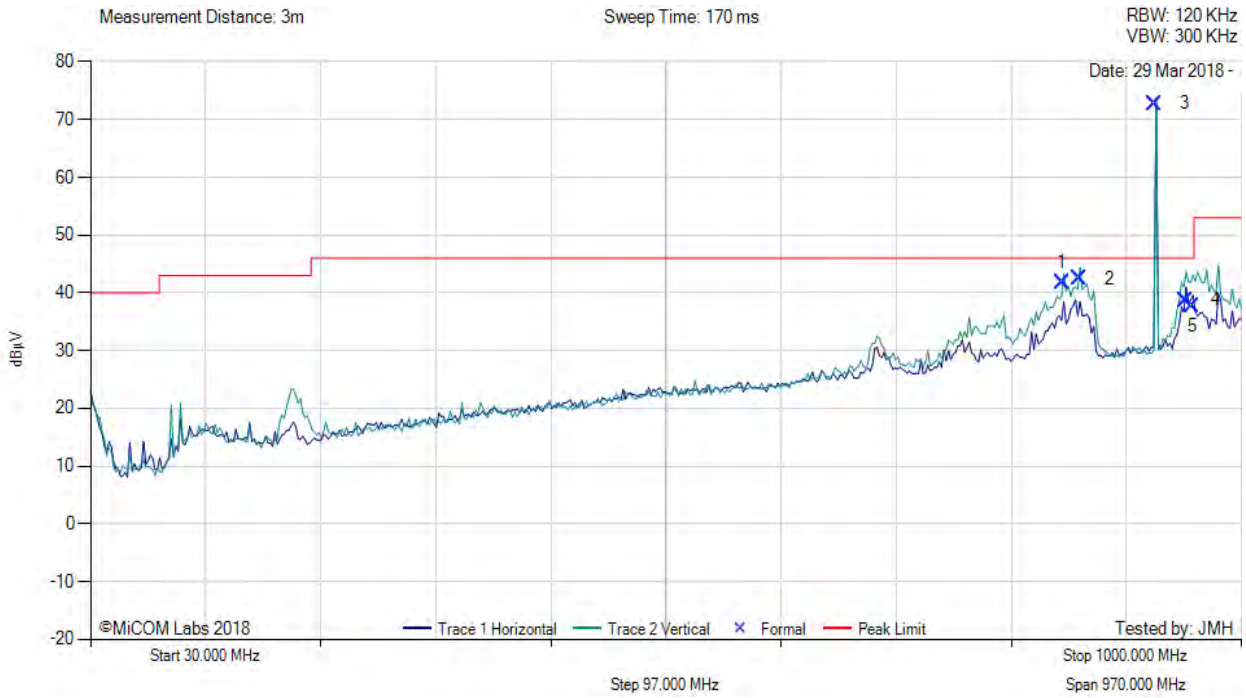
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	837.21	43.37	6.05	-8.56	40.86	MaxQP	Vertical	129	238	46.0	-5.1	Pass
2	851.19	44.16	6.12	-8.29	41.99	MaxQP	Vertical	186	202	46.0	-4.0	Pass
3	863.18	45.73	6.13	-8.14	43.72	MaxQP	Vertical	134	187	46.0	-2.3	Pass
4	915.15	42.27	6.25	-7.82	40.70	Fundamental	Horizontal	100	0	--	--	
5	956.65	37.06	6.38	-7.17	36.27	MaxQP	Vertical	121	10	46.0	-9.7	Pass

Test Notes: EUT powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

back to matrix

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: 926.90 MHz, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99



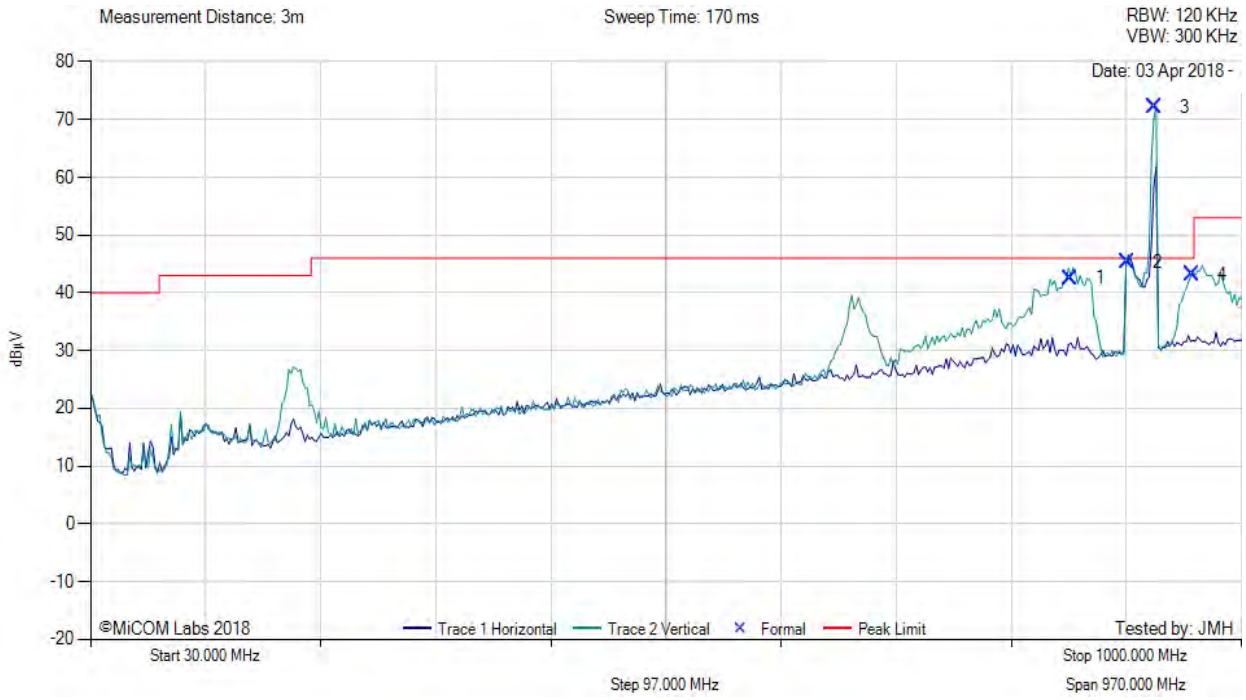
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	848.89	43.76	6.10	-8.13	41.73	MaxQP	Vertical	161	150	46.0	-4.3	Pass
2	862.85	44.48	6.14	-8.15	42.47	MaxQP	Vertical	142	192	46.0	-3.5	Pass
3	926.92	74.07	6.28	-7.64	72.71	Fundamental	Vertical	100	0	--	--	
4	952.86	39.58	6.37	-7.26	38.69	MaxQP	Vertical	159	4	46.0	-7.3	Pass
5	958.88	38.63	6.39	-7.28	37.74	MaxQP	Vertical	171	1	46.0	-8.3	Pass

Test Notes: EUT powered by 4V DC.. 900 MHz notch in front of amp to prevent overload.

back to matrix

RADIATED SPURIOUS EMISSIONS

Variant: FSK, Test Freq: Hopping, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99



30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	855.95	44.67	6.11	-8.23	42.55	Peak (NRB)	Vertical	100	0	--	--	Pass
2	903.55	46.83	6.23	-7.81	45.25	Fundamental	Vertical	100	0	--	--	Pass
3	926.37	73.58	6.28	-7.64	72.22	Fundamental	Vertical	100	0	--	--	Pass
4	958.78	44.07	6.39	-7.28	43.18	Peak (NRB)	Vertical	100	0	--	--	Pass

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

back to matrix

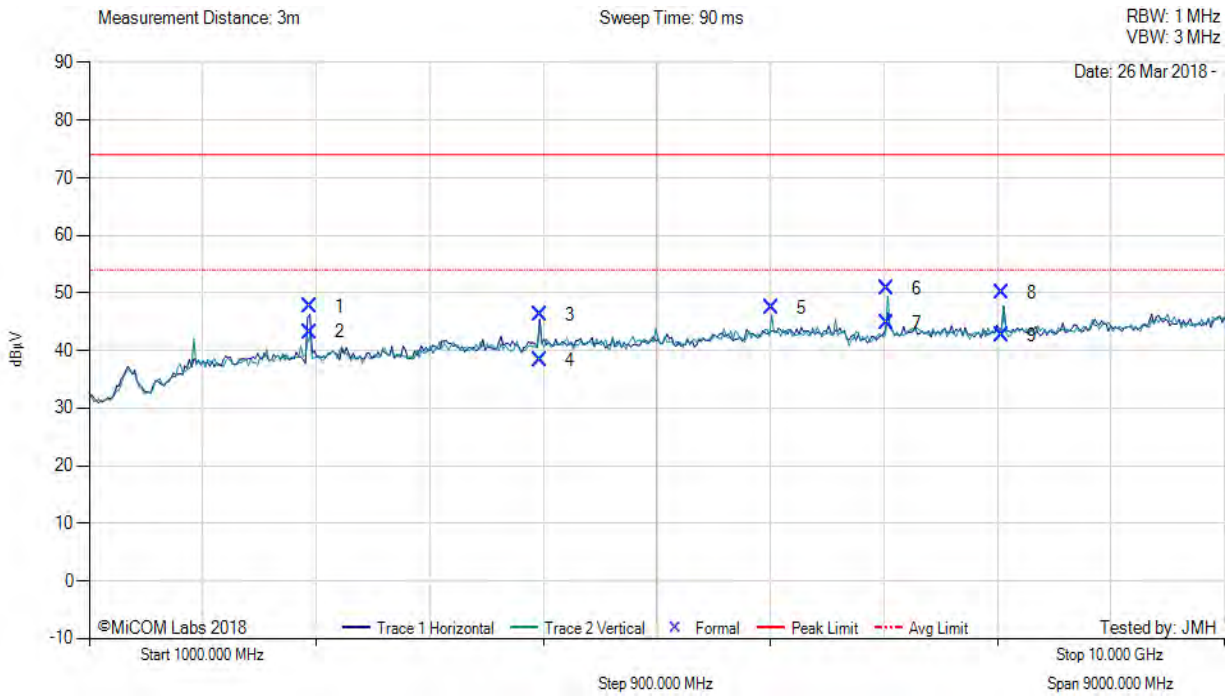
Variant: FHSS, Test Freq: 902.30 MHz, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	2706.89	55.89	2.35	-11.97	46.27	Max Peak	Horizontal	118	125	74.0	-27.7	Pass
2	2706.89	51.72	2.35	-11.97	42.10	Max Avg	Horizontal	118	125	54.0	-11.9	Pass
3	4511.45	55.35	2.89	-12.00	46.24	Max Peak	Horizontal	103	109	74.0	-27.8	Pass
4	4511.45	48.53	2.89	-12.00	39.42	Max Avg	Horizontal	103	109	54.0	-14.6	Pass
5	6315.94	58.60	3.27	-9.11	52.76	Peak (NRB)	Vertical	100	0	--	--	Pass
6	7218.40	51.72	3.48	-7.38	47.82	Peak (NRB)	Vertical	100	0	--	--	Pass

Test Notes: EUT powered by 4 volt DC

back to matrix

Variant: FHSS, Test Freq: 915.20 MHz, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99

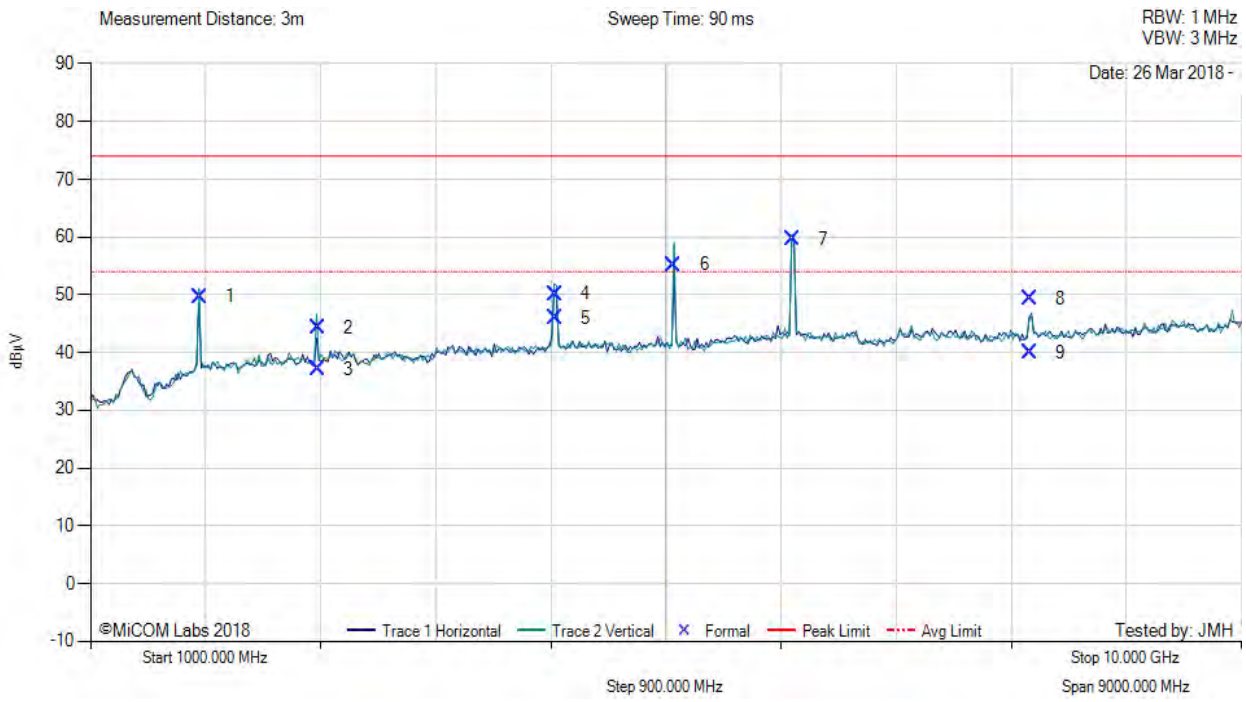


1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	2745.52	57.15	2.39	-11.96	47.58	Max Peak	Horizontal	136	129	74.0	-26.4	Pass
2	2745.52	52.79	2.39	-11.96	43.22	Max Avg	Horizontal	136	129	54.0	-10.8	Pass
3	4576.17	55.36	2.93	-12.01	46.28	Max Peak	Horizontal	120	83	74.0	-27.7	Pass
4	4576.17	47.39	2.93	-12.01	38.31	Max Avg	Horizontal	120	83	54.0	-15.7	Pass
5	6406.00	53.38	3.18	-9.21	47.35	Peak (NRB)	Vertical	100	0	--	--	Pass
6	7321.70	55.15	3.50	-7.87	50.78	Max Peak	Vertical	176	156	74.0	-23.2	Pass
7	7321.70	49.13	3.50	-7.87	44.76	Max Avg	Vertical	176	156	54.0	-9.2	Pass
8	8236.63	53.32	3.96	-7.29	49.99	Max Peak	Vertical	174	69	74.0	-24.0	Pass
9	8236.63	45.91	3.96	-7.29	42.58	Max Avg	Vertical	174	69	54.0	-11.4	Pass

Test Notes: EUT powered by 4 volt DC

back to matrix

Variant: FHSS, Test Freq: 926.90 MHz, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99



1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	1853.72	61.50	2.02	-13.81	49.71	Peak (NRB)	Vertical	100	169	--	--	Pass
2	2780.70	53.77	2.40	-11.93	44.24	Max Peak	Vertical	195	132	74.0	-29.8	Pass
3	2780.70	46.63	2.40	-11.93	37.10	Max Avg	Vertical	195	132	54.0	-16.9	Pass
4	4634.56	59.43	2.93	-12.23	50.13	Max Peak	Vertical	156	320	74.0	-23.9	Pass
5	4634.56	55.27	2.93	-12.23	45.97	Max Avg	Vertical	156	320	54.0	-8.0	Pass
6	5561.54	63.35	3.16	-11.30	55.21	Peak (NRB)	Vertical	100	360	--	--	Pass
7	6488.09	65.49	3.13	-8.96	59.66	Peak (NRB)	Vertical	100	0	--	--	Pass
8	8342.35	53.38	3.99	-8.08	49.29	Max Peak	Horizontal	189	109	74.0	-24.7	Pass
9	8342.35	44.14	3.99	-8.08	40.05	Max Avg	Horizontal	189	109	54.0	-14.0	Pass

Test Notes: EUT powered by 4 volt DC

back to matrix

TX SPURIOUS & RESTRICTED BAND EMISSIONS

Variant: FSK, Test Freq: Hopping, Antenna: WP WPANT30017-CA, Power Setting: 28, Duty Cycle (%): 99

1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	2713.19	49.57	2.36	-12.03	39.90	Max Peak	Vertical	114	137	74.0	-34.1	Pass
2	2713.19	35.66	2.36	-12.03	25.99	Max Avg	Vertical	114	137	54.0	-28.0	Pass
3	2733.94	51.02	2.38	-12.05	41.35	Max Peak	Vertical	144	279	74.0	-32.7	Pass
4	2733.94	35.72	2.38	-12.05	26.05	Max Avg	Vertical	144	279	54.0	-28.0	Pass
5	2779.94	48.69	2.40	-11.96	39.13	Max Peak	Vertical	137	6	74.0	-34.9	Pass
6	2779.94	35.29	2.40	-11.96	25.73	Max Avg	Vertical	137	6	54.0	-28.3	Pass
7	6408.71	63.15	3.17	-9.22	57.10	Peak (NRB)	Vertical	151	7	--	--	Pass
8	6446.36	63.05	3.15	-9.04	57.16	Peak (NRB)	Vertical	151	7	--	--	Pass
9	8317.67	54.00	3.98	-7.89	50.09	Max Peak	Horizontal	158	228	74.0	-23.9	Pass
10	8317.67	36.93	3.98	-7.89	33.02	Max Avg	Horizontal	158	228	54.0	-21.0	Pass

Test Notes: EUT powered by 4V DC. Hopping

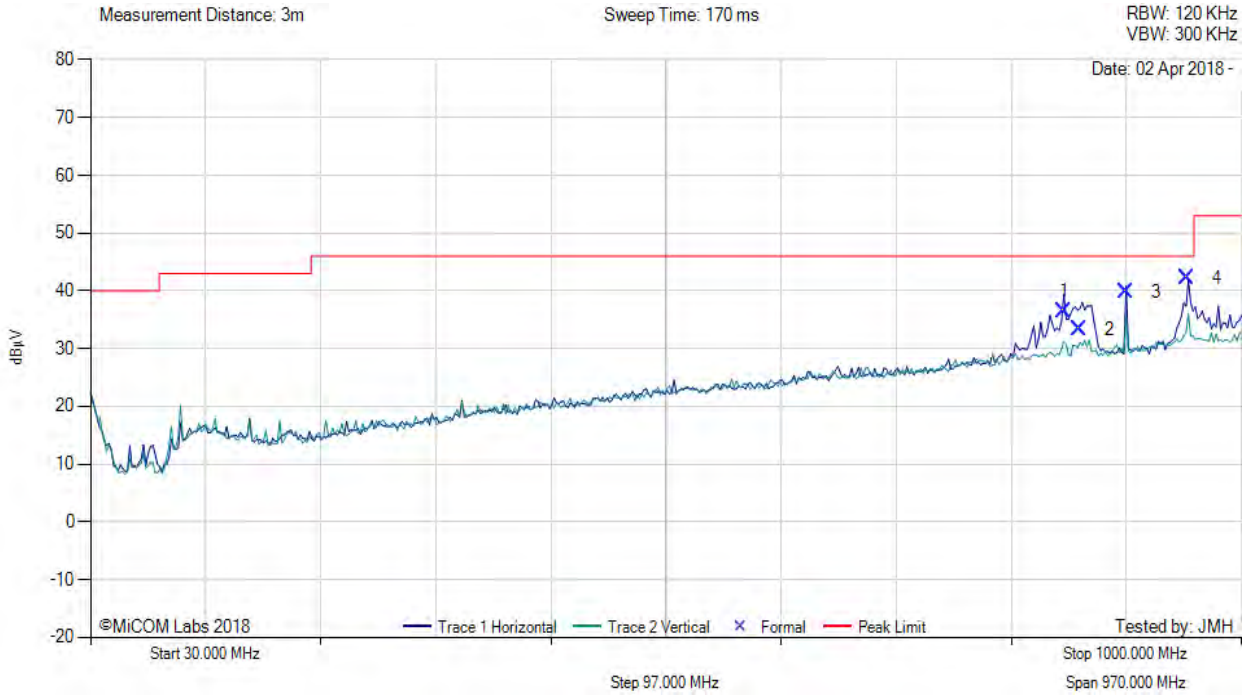
back to matrix

Wrap Antenna (WPANT40020-SA)

30-1000 MHz

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: 902.30 MHz, Antenna: WP WPANT40020-SA, Power Setting: 28, Duty Cycle (%): 99



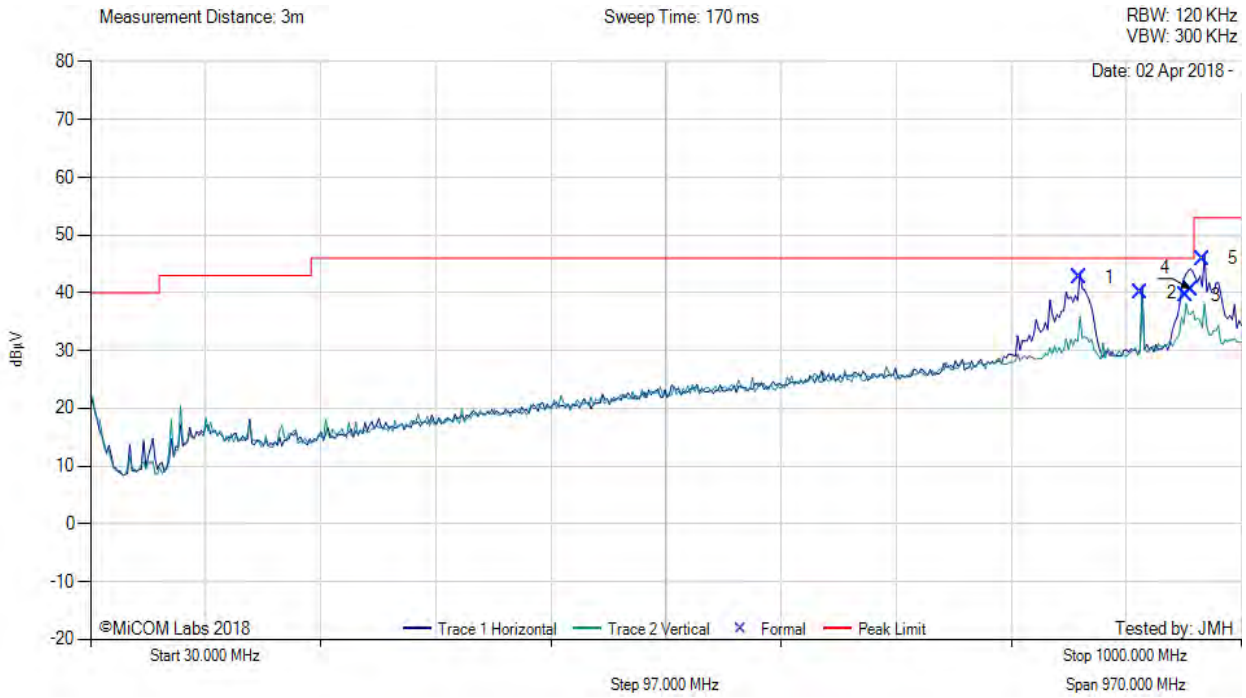
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	850.33	38.64	6.11	-8.30	36.45	MaxQP	Horizontal	192	154	46.0	-9.6	Pass
2	863.13	35.29	6.13	-8.14	33.28	MaxQP	Horizontal	200	209	46.0	-12.7	Pass
3	902.31	41.57	6.24	-8.00	39.81	Fundamental	Horizontal	100	181	--	--	
4	954.29	43.13	6.37	-7.27	42.23	MaxQP	Horizontal	163	191	46.0	-3.8	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp.

back to matrix

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: 915.20 MHz, Antenna: WP WPANT40020-SA, Power Setting: 28, Duty Cycle (%): 99



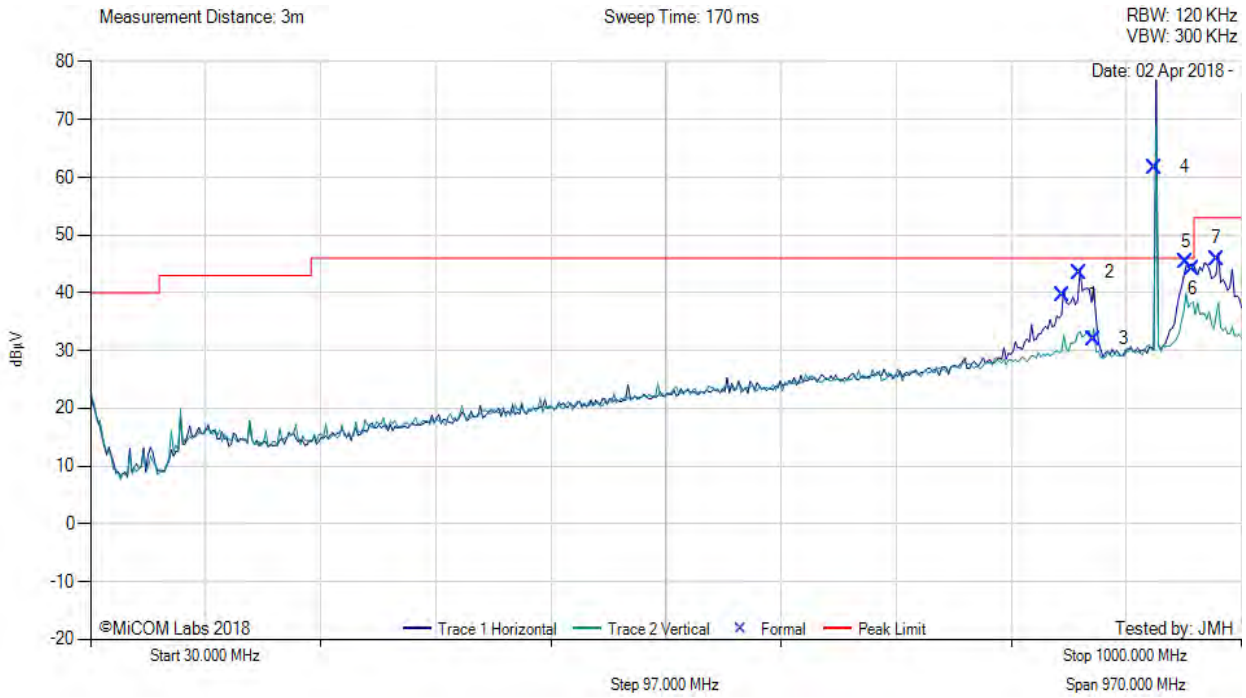
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	863.20	44.68	6.13	-8.14	42.67	MaxQP	Horizontal	201	167	46.0	-3.3	Pass
2	915.15	41.60	6.25	-7.82	40.03	Fundamental	Horizontal	100	189	--	--	
3	952.66	40.44	6.37	-7.26	39.55	MaxQP	Horizontal	105	194	46.0	-6.5	Pass
4	957.73	41.35	6.38	-7.08	40.65	MaxQP	Horizontal	168	174	46.0	-5.4	Pass
5	967.21	46.77	6.44	-7.27	45.94	MaxQP	Horizontal	154	189	53.0	-7.1	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.

back to matrix

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: 926.90 MHz, Antenna: WP WPANT40020-SA, Power Setting: 28, Duty Cycle (%): 99



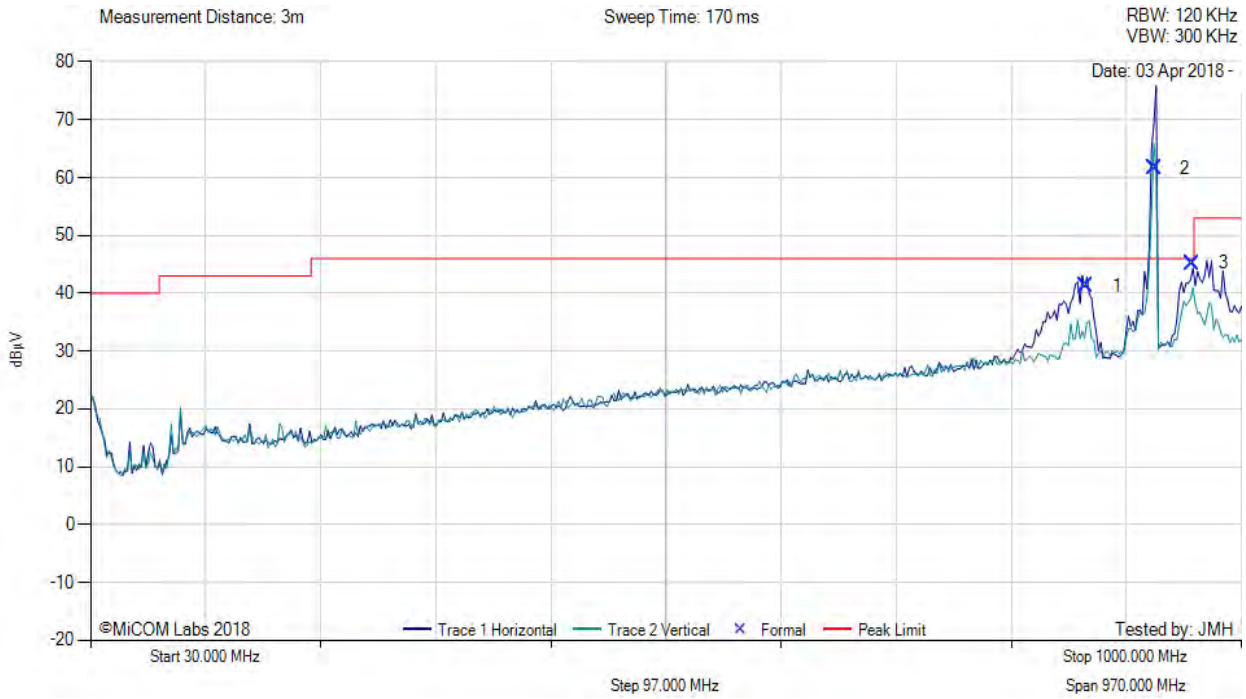
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	848.92	41.75	6.10	-8.13	39.72	MaxQP	Horizontal	127	191	46.0	-6.3	Pass
2	862.87	45.49	6.14	-8.15	43.48	MaxQP	Horizontal	123	199	46.0	-2.5	Pass
3	874.92	33.86	6.17	-7.99	32.04	MaxQP	Vertical	272	230	46.0	-14.0	Pass
4	926.92	63.08	6.28	-7.64	61.72	Fundamental	Horizontal	100	0	--	--	
5	952.88	46.15	6.37	-7.26	45.26	MaxQP	Horizontal	110	179	46.0	-0.7	Pass
6	958.89	45.17	6.39	-7.28	44.28	MaxQP	Horizontal	224	202	46.0	-1.7	Pass
7	978.88	46.37	6.46	-6.89	45.94	MaxQP	Horizontal	221	200	53.0	-7.1	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overloads.

back to matrix

RADIATED DIGITAL EMISSIONS

Variant: FSK, Test Freq: Hopping, Antenna: WP WPANT40020-SA, Power Setting: 28, Duty Cycle (%): 99



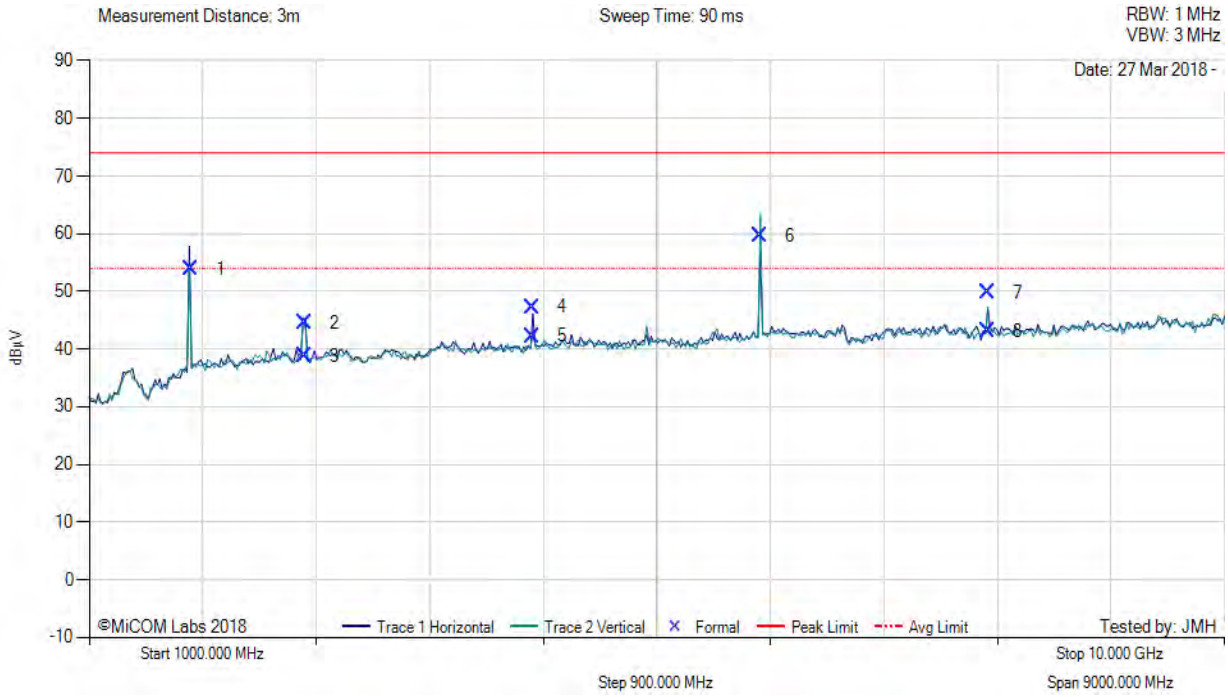
30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	869.23	43.17	6.16	-8.10	41.23	Peak (NRB)	Horizontal	100	10	--	--	Pass
2	926.92	62.99	6.28	-7.64	61.63	Fundamental	Horizontal	100	0	--	--	Pass
3	958.85	46.07	6.39	-7.28	45.18	Peak (NRB)	Horizontal	100	164	--	--	Pass

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

back to matrix

1-10 GHz

Variant: FHSS, Test Freq: 902.30 MHz, Power Setting: 28, Duty Cycle (%): 99

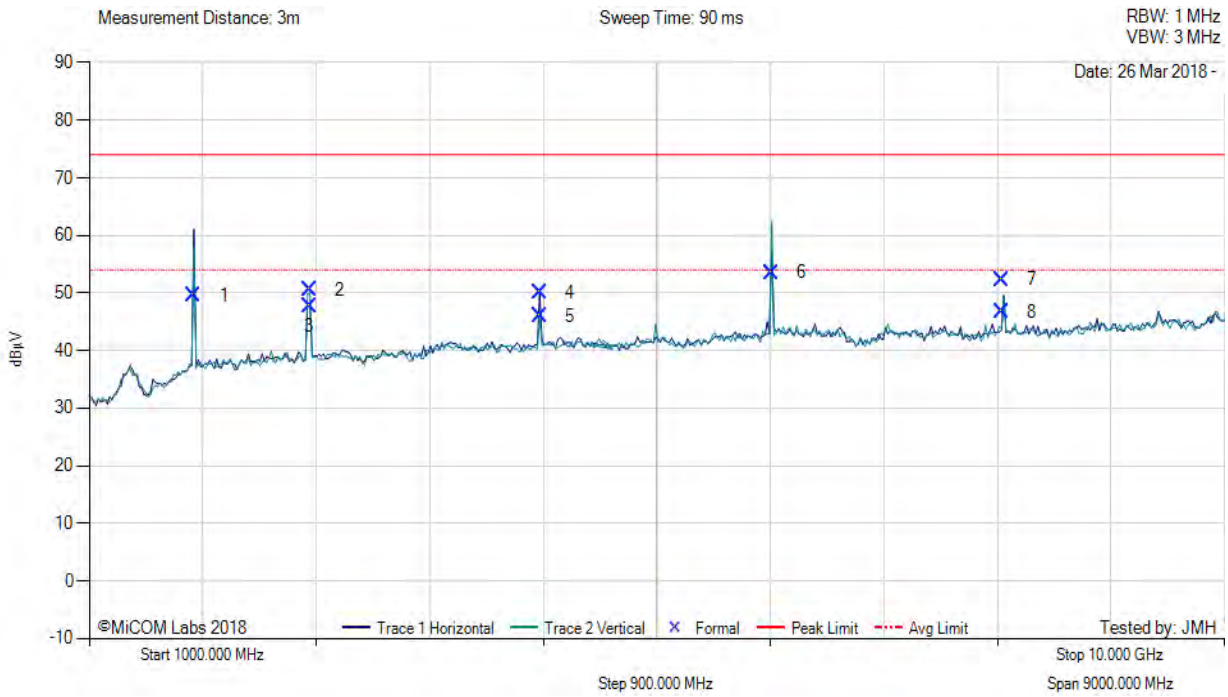


1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	1804.54	66.25	2.03	-14.44	53.84	Peak (NRB)	Horizontal	100	158	--	--	Pass
2	2707.00	54.20	2.35	-11.97	44.58	Max Peak	Vertical	102	100	74.0	-29.4	Pass
3	2707.00	48.35	2.35	-11.97	38.73	Max Avg	Vertical	102	100	54.0	-15.3	Pass
4	4511.46	56.38	2.89	-12.00	47.27	Max Peak	Horizontal	141	144	74.0	-26.7	Pass
5	4511.46	51.35	2.89	-12.00	42.24	Max Avg	Horizontal	141	144	54.0	-11.8	Pass
6	6316.07	65.51	3.27	-9.12	59.66	Peak (NRB)	Vertical	100	158	--	--	Pass
7	8120.56	53.48	4.04	-7.69	49.83	Max Peak	Vertical	187	139	74.0	-24.2	Pass
8	8120.56	46.77	4.04	-7.69	43.12	Max Avg	Vertical	187	139	54.0	-10.9	Pass

Test Notes: EUT powered by 4 volt DC,

back to matrix

Variant: FHSS, Test Freq: 915.20 MHz, Power Setting: 28, Duty Cycle (%): 99

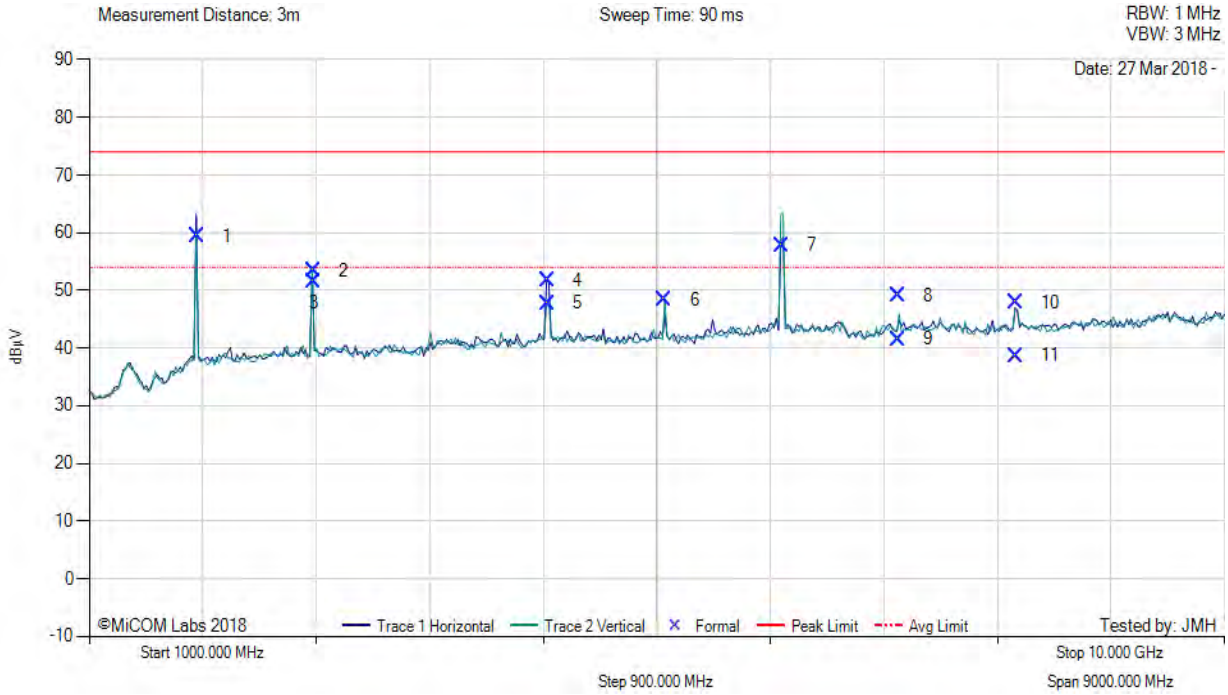


1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	1830.38	61.62	2.03	-14.03	49.62	Peak (NRB)	Horizontal	100	21	--	--	Pass
2	2745.63	60.07	2.39	-11.96	50.50	Max Peak	Vertical	131	188	74.0	-23.5	Pass
3	2745.63	57.33	2.39	-11.96	47.76	Max Avg	Vertical	131	188	54.0	-6.2	Pass
4	4576.05	59.06	2.93	-12.01	49.98	Max Peak	Horizontal	102	157	74.0	-24.0	Pass
5	4576.05	55.11	2.93	-12.01	46.03	Max Avg	Horizontal	102	157	54.0	-8.0	Pass
6	6406.60	59.58	3.18	-9.21	53.55	Peak (NRB)	Vertical	100	0	--	--	Pass
7	8236.91	55.67	3.96	-7.29	52.34	Max Peak	Horizontal	148	29	74.0	-21.7	Pass
8	8236.91	49.99	3.96	-7.29	46.66	Max Avg	Horizontal	148	29	54.0	-7.3	Pass

Test Notes: EUT powered by 4 volt DC,

back to matrix

Variant: FHSS, Test Freq: 926.90 MHz, Power Setting: 28, Duty Cycle (%): 99



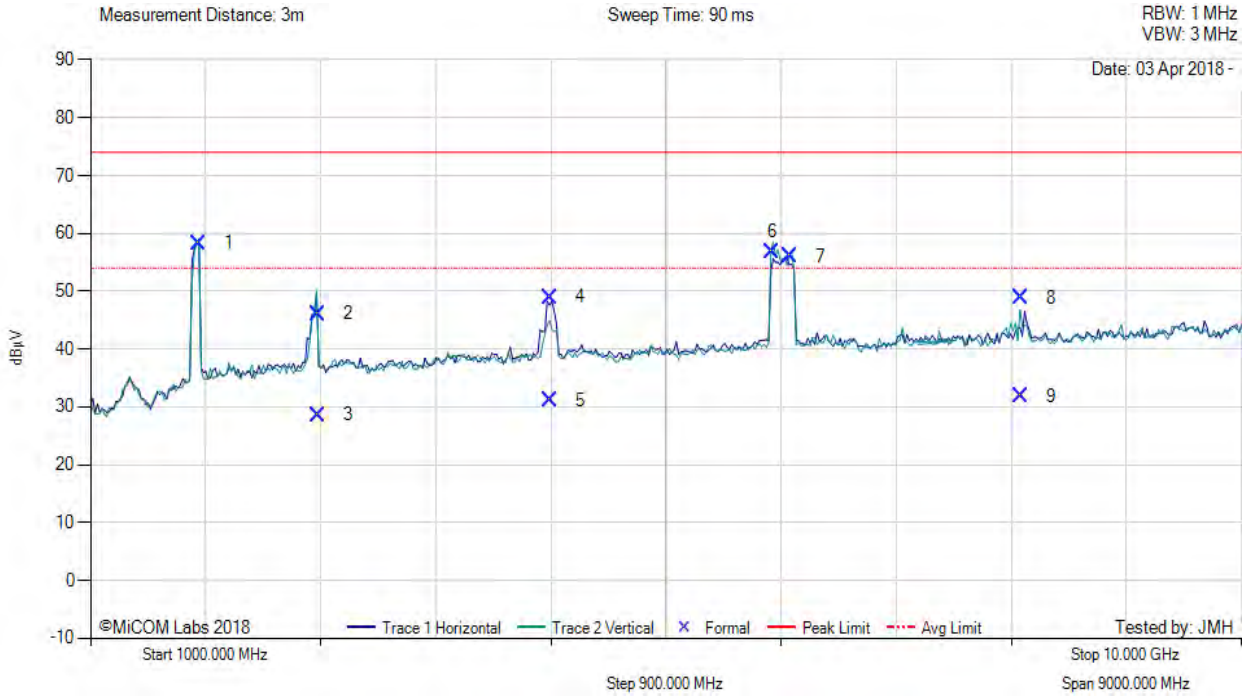
1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	1853.70	71.11	2.02	-13.81	59.32	Peak (NRB)	Horizontal	100	153	--	--	Pass
2	2780.67	62.87	2.40	-11.93	53.34	Max Peak	Horizontal	100	141	74.0	-20.7	Pass
3	2780.67	60.97	2.40	-11.93	51.44	Max Avg	Horizontal	100	141	54.0	-2.6	Pass
4	4634.33	61.03	2.93	-12.23	51.73	Max Peak	Horizontal	100	150	74.0	-22.3	Pass
5	4634.33	57.07	2.93	-12.23	47.77	Max Avg	Horizontal	100	150	54.0	-6.2	Pass
6	5561.24	56.48	3.16	-11.30	48.34	Peak (NRB)	Vertical	100	153	--	--	Pass
7	6488.05	63.70	3.13	-8.96	57.87	Peak (NRB)	Vertical	100	86	--	--	Pass
8	7415.39	53.51	3.54	-7.93	49.12	Max Peak	Vertical	146	131	74.0	-24.9	Pass
9	7415.39	45.93	3.54	-7.93	41.54	Max Avg	Vertical	146	131	54.0	-12.5	Pass
10	8342.02	51.99	3.99	-8.08	47.90	Max Peak	Horizontal	108	43	74.0	-26.1	Pass
11	8342.02	42.77	3.99	-8.08	38.68	Max Avg	Horizontal	108	43	54.0	-15.3	Pass

Test Notes: EUT powered by 4 volt DC.

back to matrix

TX SPURIOUS & RESTRICTED BAND EMISSIONS

Variant: FSK, Test Freq: 0.00 MHz, Antenna: WP WPANT40020-SA, Power Setting: 28, Duty Cycle (%): 99



1000.00 - 10000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	1845.99	70.17	2.03	-13.89	58.31	Peak (NRB)	Horizontal	151	160	--	--	Pass
2	2777.06	55.69	2.40	-12.02	46.07	Max Peak	Vertical	175	152	74.0	-27.9	Pass
3	2777.06	38.22	2.40	-12.02	28.60	Max Avg	Vertical	175	152	54.0	-25.4	Pass
4	4591.04	58.10	2.91	-12.01	49.00	Max Peak	Horizontal	118	128	74.0	-25.0	Pass
5	4591.04	40.19	2.91	-12.01	31.09	Max Avg	Horizontal	118	128	54.0	-22.9	Pass
6	6332.89	62.76	3.23	-9.29	56.70	Peak (NRB)	Vertical	151	160	--	--	Pass
7	6469.57	61.98	3.18	-9.06	56.10	Peak (NRB)	Vertical	151	160	--	--	Pass
8	8276.97	52.48	3.98	-7.67	48.79	Max Peak	Vertical	178	46	74.0	-25.2	Pass
9	8276.97	35.54	3.98	-7.67	31.85	Max Avg	Vertical	178	46	54.0	-22.2	Pass

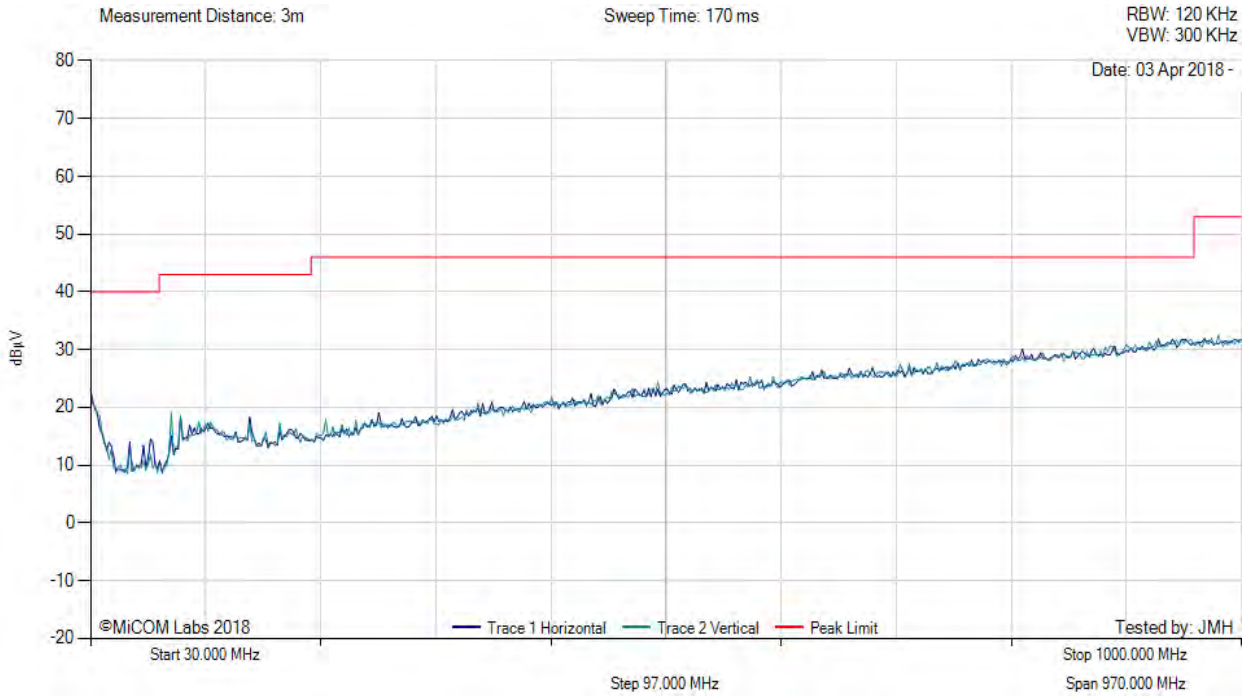
Test Notes: EUT powered by 4V DC. Hopping

back to matrix

A.3.3. Digital Emissions (0.03 - 1 GHz)

RADIATED DIGITAL EMISSIONS

Variant: FHSS, Test Freq: 915.2 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: NA, Duty Cycle (%): 99

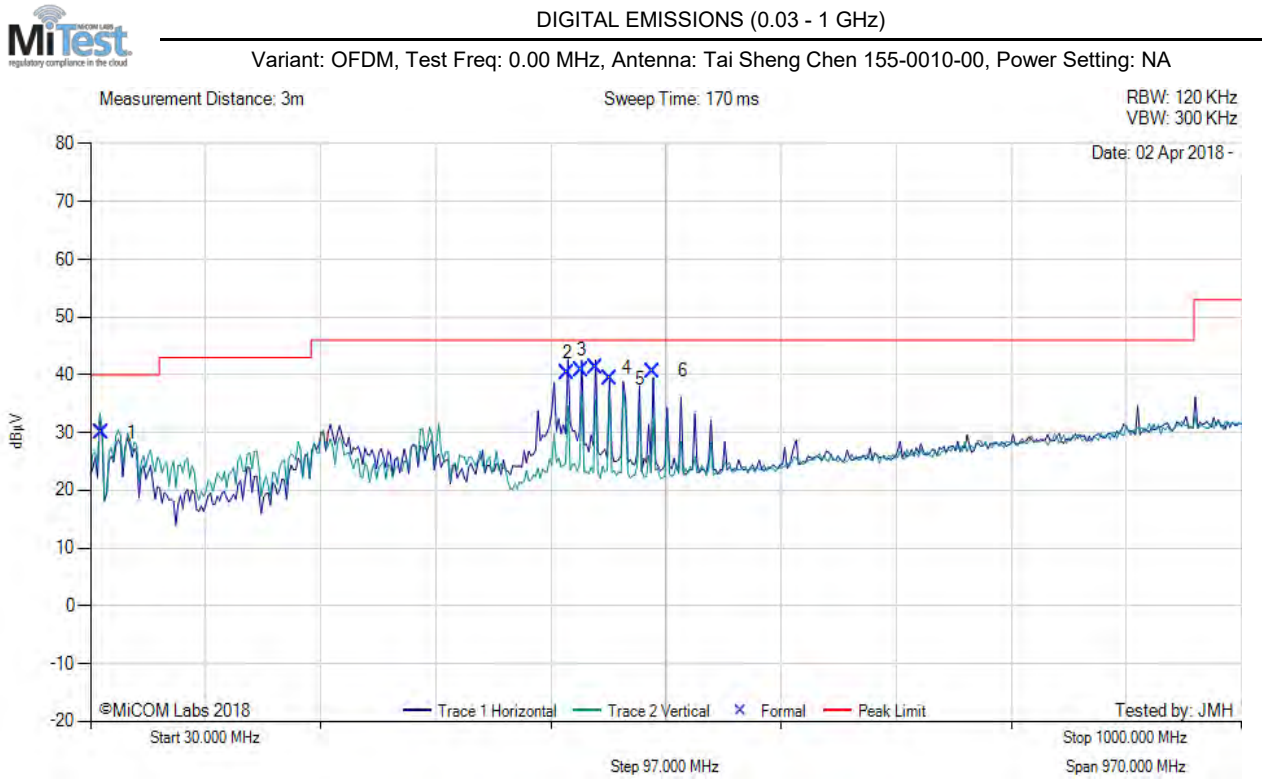


There are no emissions found within 6dB of the limit line.

Test Notes: EUT powered by 4V DC. Receiver Emissions

back to matrix

USB Active and downloading, Connected to SBC computer

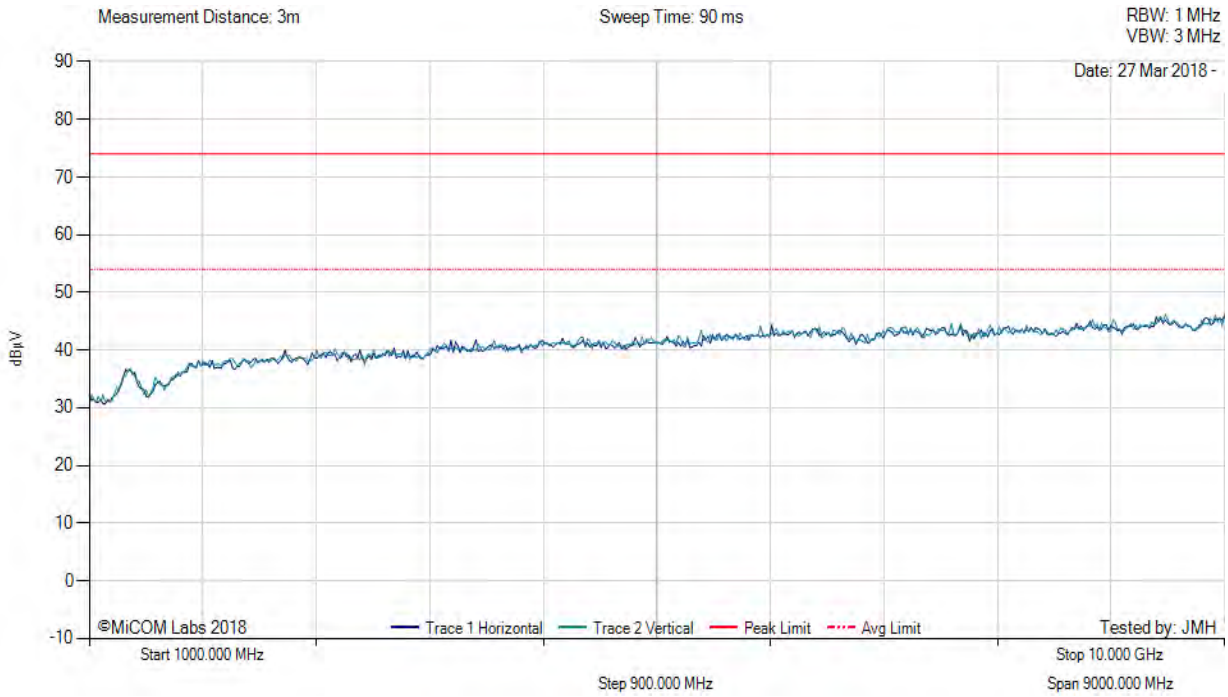


30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	39.02	43.91	3.47	-17.37	30.01	MaxQP	Vertical	104	71	40.0	-10.0	Pass
2	431.96	49.59	4.99	-14.31	40.27	MaxQP	Horizontal	204	154	46.0	-5.7	Pass
3	443.99	49.98	5.02	-14.21	40.79	MaxQP	Horizontal	101	356	46.0	-5.2	Pass
4	456.01	50.18	5.04	-13.93	41.29	MaxQP	Horizontal	282	349	46.0	-4.7	Pass
5	468.02	47.67	5.07	-13.37	39.37	MaxQP	Horizontal	101	301	46.0	-6.6	Pass
6	503.99	48.65	5.20	-13.23	40.62	MaxQP	Horizontal	159	160	46.0	-5.4	Pass

Test Notes: Powered by AC/DC PS. Digital Communications over USB. Connected to SBC.

back to matrix

Variant: FHSS, Test Freq: 915.2 MHz, Power Setting: NA, Duty Cycle (%): 99



There are no emissions found within 6dB of the limit line.

Test Notes: EUT powered by 4 volt DC, Receiver Emissions

back to matrix

575 Boulder Court
Pleasanton, California 94566, USA
Tel: +1 (925) 462 0304
Fax: +1 (925) 462 0306
www.micomlabs.com