Company: Tehama Wireless

Test of: TW-160B-P, TX-165B-E

To: FCC Part 15.247 (DTS) & IC RSS-247

Report No.: TEHA06-U5 Rev A

TEST REPORT

Added Digital Emission for 'Worst Case' Configuration TW-165B-E is only change for this U5 report vs previous U2 report

TEST REPORT

FROM

MiCOM Labs
opening wireless markets

Test of: Tehama Wireless TW-160B-P, TW-165B-E

to

FCC Part 15.247 (DTS) & IC RSS-247

Test Report Serial No.: TEHA06-U5 Rev A

This report supersedes: TEHA06-U5 Draft

Applicant:	Tehama Wireless 2607 7th St. Suite D Berkeley California 94710 USA
Product Function:	Wireless Meter Reading
Issue Date:	22th August 2016

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

Contents

1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. Test 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

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*).

Presented this 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2017

For the tests or types of 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 accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2017

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	12th August 2016	Added Digital Emission results for worst case config TW-165B-E
Rev A	22th August 2016	Initial Release

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

3. TEST RESULT CERTIFICATE

Manufacturer: Tehama Wireless 2607 7th St. Suite D Berkeley California 94710 USA	**Tested By:** MiCOM Labs, Inc. 575 Boulder Court Pleasanton California, 94566, USA
EUT: Wireless Meter Reader **Model:** TW-160B-P, TW-165B-E	**Telephone:** +1 925 462 0304 **Fax:** +1 925 462 0306
S/N's: Development	
Test Date(s): 27th January 2016 & 18th March 2016, 12th Aug 2016	**Website:** www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15 Subpart C 15.247 **Industry Canada 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	A2LA	June 2015	Reference to A2LA Accreditation Status – A2LA Advertising Policy
II	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
III	CISPR 22	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
IV	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
V	FCC 47 CFR Part 15.247	2016	CFR Title 47 Part 15.247 – Radio Frequency Devices; Subpart C – Intentional Radiators
VI	LAB34	Edition 1 August 2002	The expression of uncertainty in EMC Testing
VII	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements
VIII	RSS-247 Issue 1	May 2015	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
IX	RSS-Gen Issue 4	November 13, 2014	General Requirements and Information for the Certification of Radiocommunication Equipment
XI	FCC 47 CFR Part 2.1033	2016	FCC requirements and rules regarding photographs and test setup diagrams.

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 Tehama Wireless TW111 to FCC CFR 47 Part 15 Subpart C 15.247 (DTS) and IC RSS-247
Applicant:	Tehama Wireless 2607 7th St. Suite D Berkeley California 94710 USA
Manufacturer:	As Applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, California 94566 USA
Test report reference number:	TEHA06-U2
Date EUT received:	27th January 2016 18th March 2016
Standard(s) applied:	FCC CFR 47 Part 15 Subpart C 15.247 (DTS) Industry Canada RSS-247
Dates of test (from - to):	27th January – 18th March 2016, 12th August 2016
No of Units Tested:	2 (3 models, see Section 5.2 Scope of Test Program)
Type of Equipment:	900 MHz Wireless meter reader
Product Trade Name:	Tehama Wireless Design Group
Model(s):	TW-16x, model tested TW-160B-P, TW-165B-E
Location for use:	Indoor
Declared Frequency Range(s):	902 - 928 MHz;
Hardware Rev	3.0
Software Rev	1.11A
Type of Modulation:	GFSK
EUT Modes of Operation:	FHSS: 902 - 928 MHz:
Declared Nominal Output Power (Ave):	+9.2 dBm
Transmit/Receive Operation:	Transceiver - Simplex
System Beam Forming:	This device has no beam-forming capability
Rated Input Voltage and Current:	3.0Vdc, Max 3.6Vdc Min 1.9Vdc
Operating Temperature Range:	Client Declared Range 0°C to 60°C
ITU Emission Designator:	151KF1D
Equipment Dimensions:	3.5" x 2.1" x 1.2”
Weight:	3.8 oz with batteries (2.3 oz without batteries)
Primary function of equipment:	Wireless meter reader
Secondary function of equipment:	None provided

5.2. Scope Of Test Program

Tehama Wireless TW-160B-P Wireless meter reader

The scope of the test program was to test the Tehama Wireless TW-160B-P FHSS wireless meter reader in the frequency range 902 - 928 MHz; for compliance against FCC CFR 47 Part 15 Subpart C 15.247 (DTS) specifications.

Added worst case digital emissions for TW-165B-E, all other radio circuitry and layout remain the same as models designated in TEHA06-U2 report.

Wireless Meter Reader Models

There are three customer facing product numbers and all products have the same common PCB (printed circuit board) fab and identical radio.
:

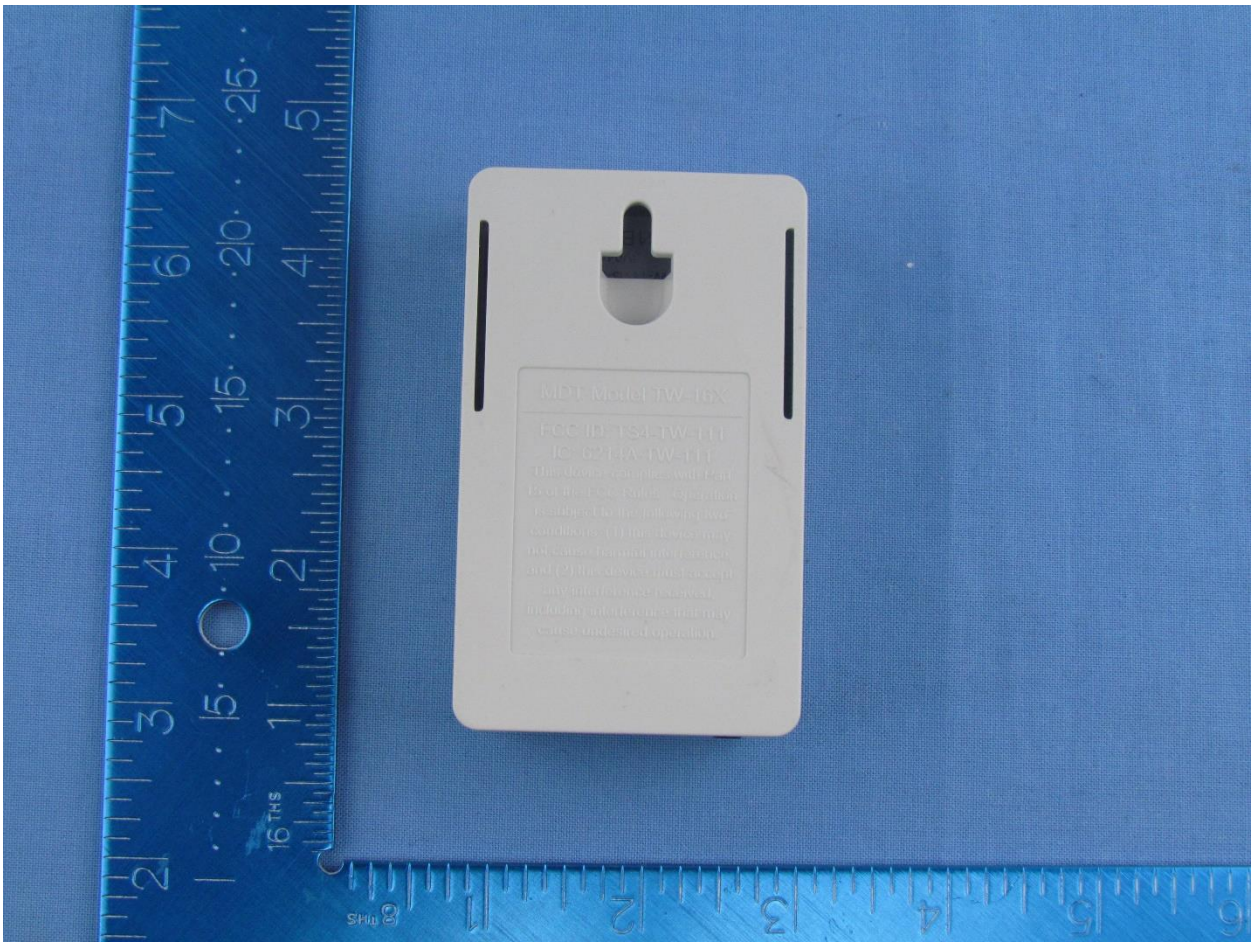
TW-160B-P **(and some variations that differ by software features enabled during production)**
Hardware with connector to interface to utility meters

TW-162 **(no variations)**
Hardware with reed switch instead of connector. Magnetically read meter dials directly
Different housing to mate directly to a water meter

TW-165B-E **(and 3 other variations that differ by software features)**
Hardware with connector and LCD display.
Housing like TW-160 but with cut-out for LCD
Display is simple 7 segment with static display driven directly from microprocessor
Display is active ONLY when customer hits button and turns off after 60 seconds
Radio is OFF whenever the LCD is turned on

Tehama Wireless TW-160B-P Wireless Meter Reader

Tehama Wireless TW-160B-P Wireless Meter Reader



Tehama Wireless TW-165B-E Wireless Meter Reader

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

Model / Description	Serial no.	Hardware ver.	SoftWare ver.
TW-160B-P	Development	3.0	1.11A
TW-165B-E	Development	3.0	1.11A

5.4. Antenna Details

Type	Manufacturer	Model	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
PCB	Tehama Wireless	Meander Line (MLA)	1.3	-	-	-	902 - 928

BF Gain - Beamforming Gain
Dir BW - Directional BeamWidth
X-Pole – Cross Polarization

5.5. Cabling and I/O Ports

Number and type of I/O ports

1. Audio stereo jack 3.5mm (3 pins UART), 6’ long cable

5.6. Test Configurations

Operational Mode(s)	Data Rate with Highest Power	Channel Frequency (MHz)		
		Low	Mid	High
902 - 928 MHz				
FHSS	25 KBit/s	902.92	914.82	925.92

Results for the above configurations are provided in this report

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

6. TEST SUMMARY

List of Measurements

Test Header	Result
Conducted Testing	
15.247(a)(2) 20 dB & 99% Bandwidth	Complies
15.247(a)(1) Channel Spacing	Complies
15.247(a)(1) Number of Hopping Channels	Complies
15.247(a)(1) Channel Occupancy	Complies
15.247(b), 15.31(e) Conducted Output Power	Complies
15.247(d) Emissions	-
(1) Conducted Emissions	-
(i) Conducted Spurious Emissions	Complies
(ii) Conducted Band-Edge Emissions	Complies
Radiated Testing	
15.205 Radiated Spurious Emissions	Complies
15.209 Digital Emissions	Complies

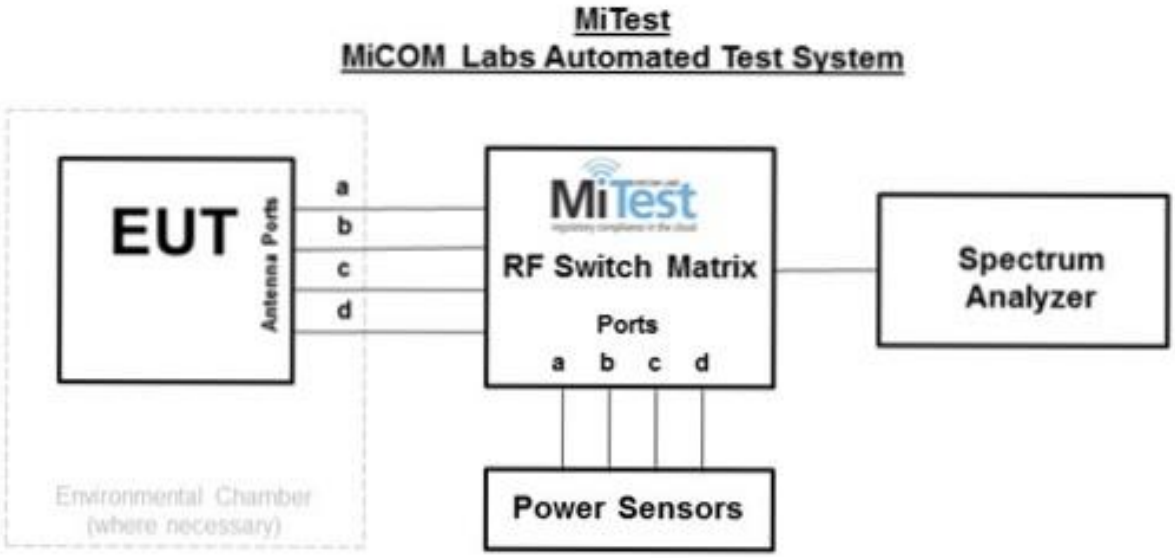
7. TEST EQUIPMENT CONFIGURATION(S)

7.1. Conducted

Conducted RF Emission Test Set-up(s) with Environmental Chamber
The following tests were performed using the conducted test set-up shown in the diagram below.

1. RF Output Power
2. 20 dB & 99% Bandwidth
3. Dwell Time, Channel Occupancy, Channel Spacing, No. of Hopping Channels
4. Transmitter Spurious Emissions (Conducted)

*environmental chamber utilized



Conducted Test Measurement Setup

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.

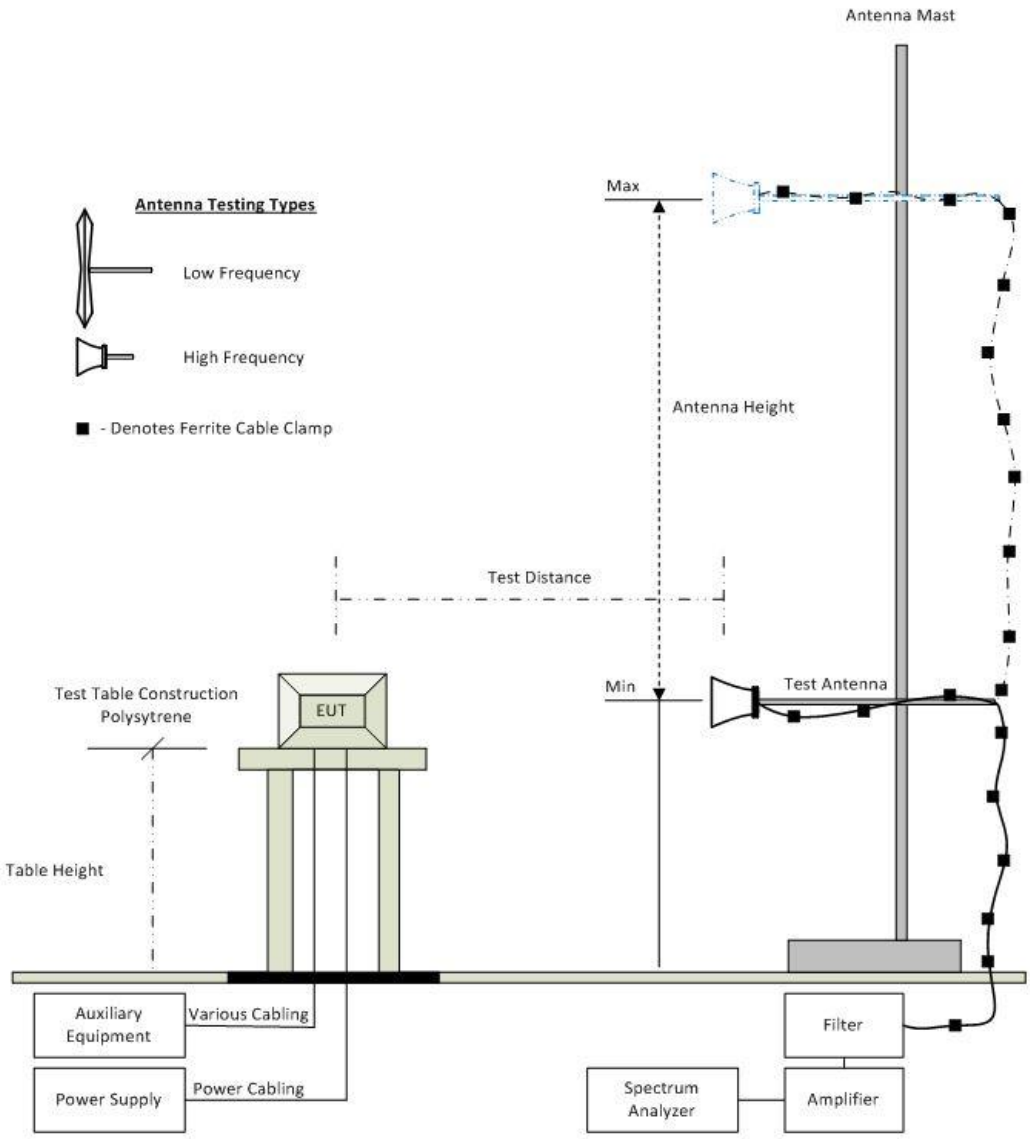
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	23 Oct 2016
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	27 Aug 2016
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2016
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	18 Jun 2016
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Oct 2016
398	Test Software	MiCOM	MiTest ATS	Version 3.0.0.16	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	31 Jul 2016
437	USB Wideband Power Sensor	Boonton	55006	8759	31 Jul 2016
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
461	Spectrum Analyzer	Agilent	E4440A	MY46185537	13 Aug 2016
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	24 Nov 2016
RF#1 GPIB#1	GPIB cable to Power Supply	HP	GPIB	None	Not Required
RF#1 SMA SA #452	Precision SMA Male RG-402 Spectrun Analyzer	Fairview Microwave	Precision SMA Male RG 402 coax	None	18 Jun 2016
RF#1 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	18 Jun 2016
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	18 Jun 2016
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	18 Jun 2016
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	18 Jun 2016
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

7.2. Radiated Emissions

The following tests were performed using the radiated test set-up shown in the diagram below.

1. Radiated Spurious and Band-Edge Emissions

Radiated Emission Measurement Setup Pictorial Representation



Radiated Emission Test Setup

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CY101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2017
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	15 Aug 2016
396	2.4 GHz Notch Filter	Microtronics	BRM50701	001	18 Aug 2016
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	09 Jun 2017
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10th Oct 2016
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	09 Jun 2017
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	Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0.73	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	31 May 2017
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	31 May 2017
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	31 May 2017
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	02 Jun 2017
480	Cable - Bulkhead to Amp	SRC Haverhill	157-157-3050360	480	02 Jun 2017
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-151-3050787	481	02 Jun 2017
482	Cable - Amp to Antenna	SRC Haverhill	157-157-3051574	482	02 Jun 2017
CC05	Confidence Check	MiCOM	CC05	None	26 Oct 2016

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

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-247

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

Section 4.1 Conducted RF Emission Test Set-up identifies the test configuration

Equipment Configuration for 20 dB & 99% Bandwidth

Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

Test Measurement Results

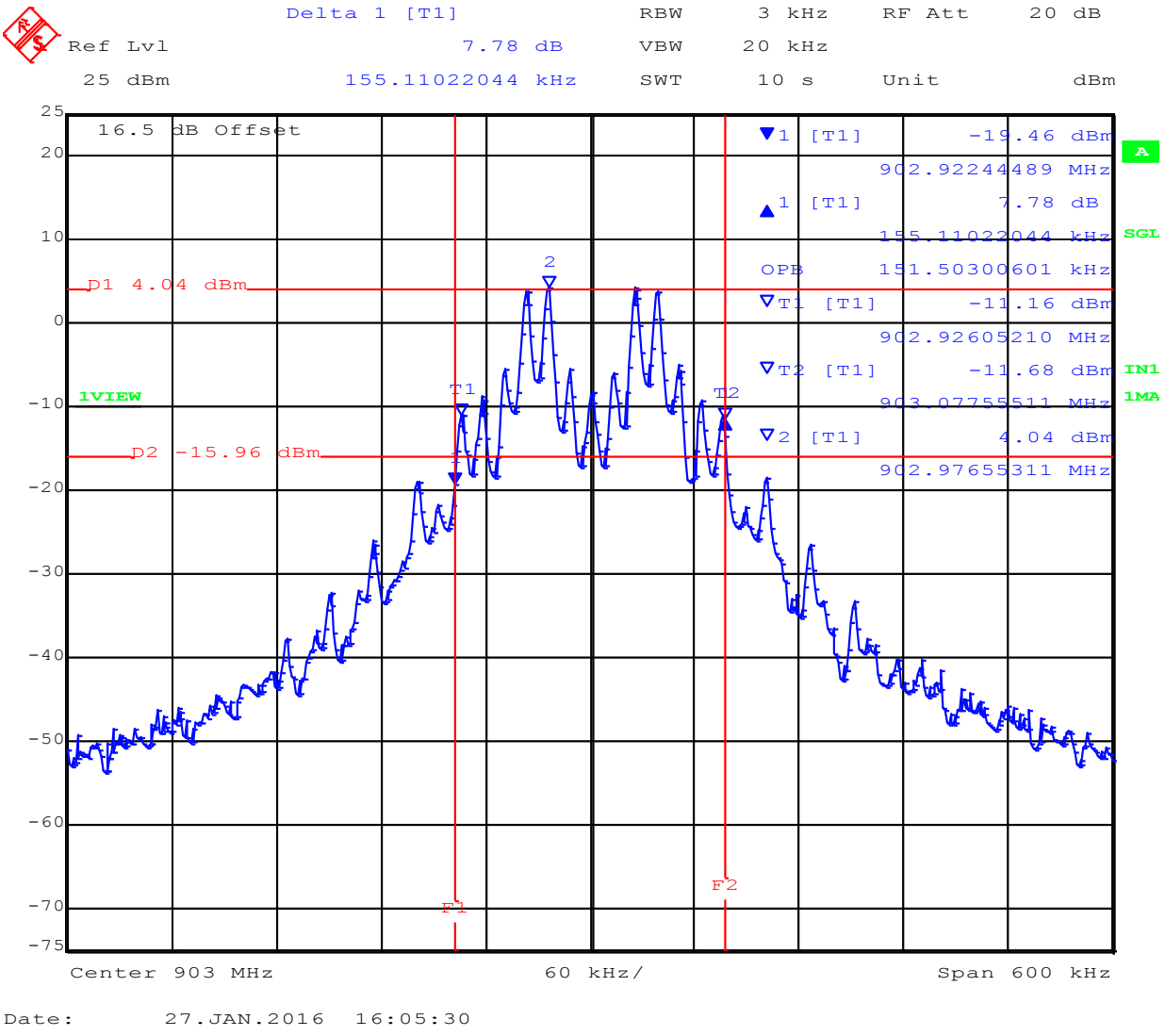
Test Frequency	Measured 6 dB Bandwidth (kHz) Port(s)				20 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	kHz
902.92	155.1				155.1	155.1	≤250.00	-94.9
914.82	155.1				155.1	155.1	≤250.00	-94.9
925.92	155.1				155.1	155.1	≤250.00	-94.9

Test Frequency	Measured 99% Bandwidth (kHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
902.92	151.5				151.5		
914.82	151.5				151.5		
925.92	151.5				151.5		

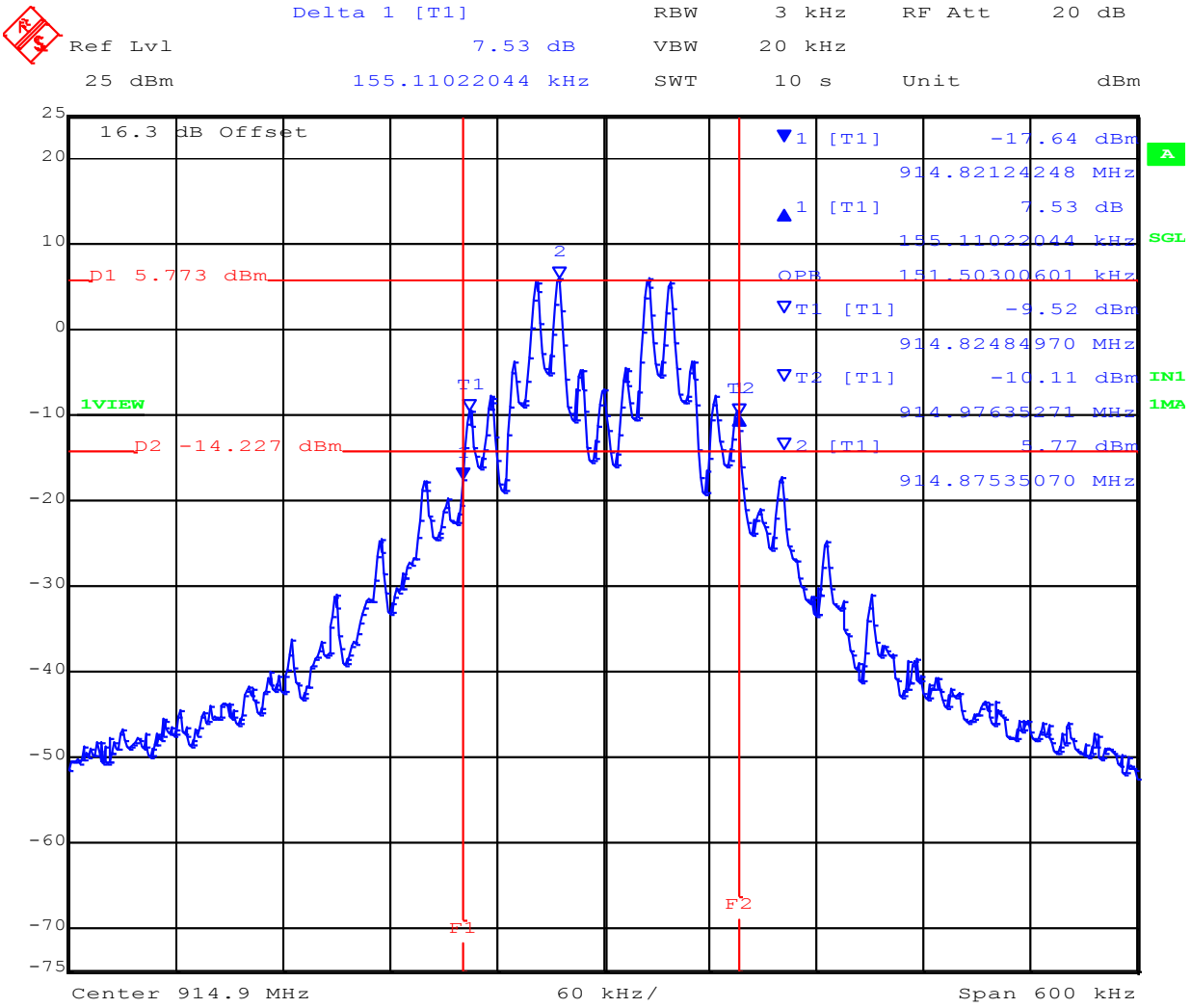
Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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

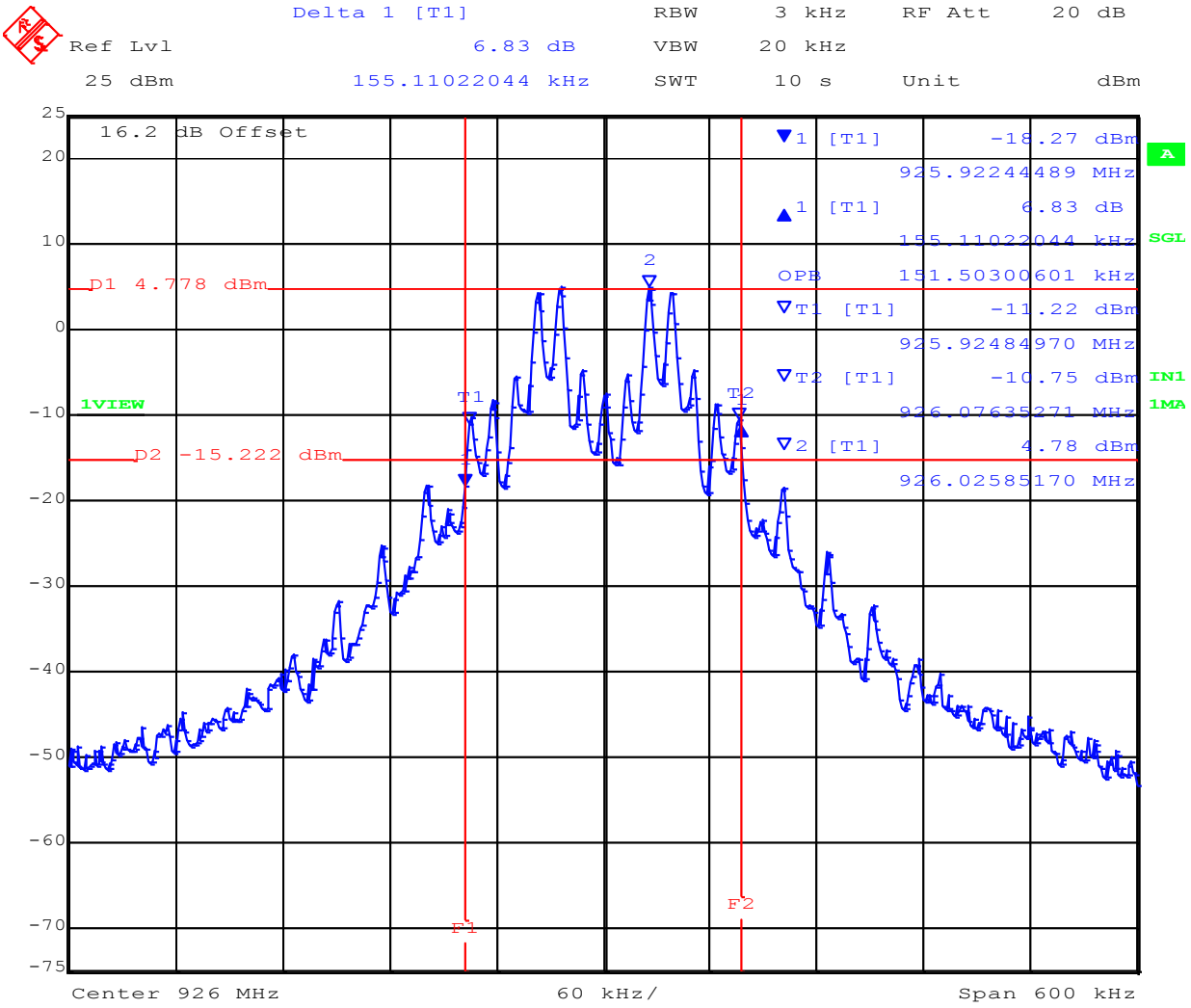
20 dB & 99% Bandwidth – Low Channel



20 dB & 99% Bandwidth – Mid Channel



20 dB & 99% Bandwidth – High Channel



9.2. FHSS Transmitter Characteristics

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-247

Test Procedure
The number of channels and channel occupancy is measured with a spectrum analyzer connected to the antenna terminal, while the EUT is operating in transmission mode at the appropriate center frequency and modulation.

Section 7 Test Equipment Configurations identifies the test configuration used to prove compliance

9.2.1. Frequency Hopping – Number Of Channels

Equipment Configuration for Frequency Hopping – Number of Channels			
Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

Test Measurement Results

Modulation	Frequency Range (MHz)	Number of Hopping per Frequency Segment	Total Hopping Channels
25 Kbit/s	902-928	60	60

9.2.2. Channel Spacing

Equipment Configuration for Channel Spacing			
Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

Test Measurement Results

Modulation	Channel Spacing (KHz)	Maximum 20 dB Bandwidth (KHz)	Specification	Compliant
25 Kbit/s	350.7	155.1	Greater than maximum 20 dB Bandwidth	√

9.2.3. Dwell Time

Equipment Configuration for Channel Dwell Time			
Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

Test Measurement Results

Modulation	Dwell Time (ms)
25 Kbit/s	11.567

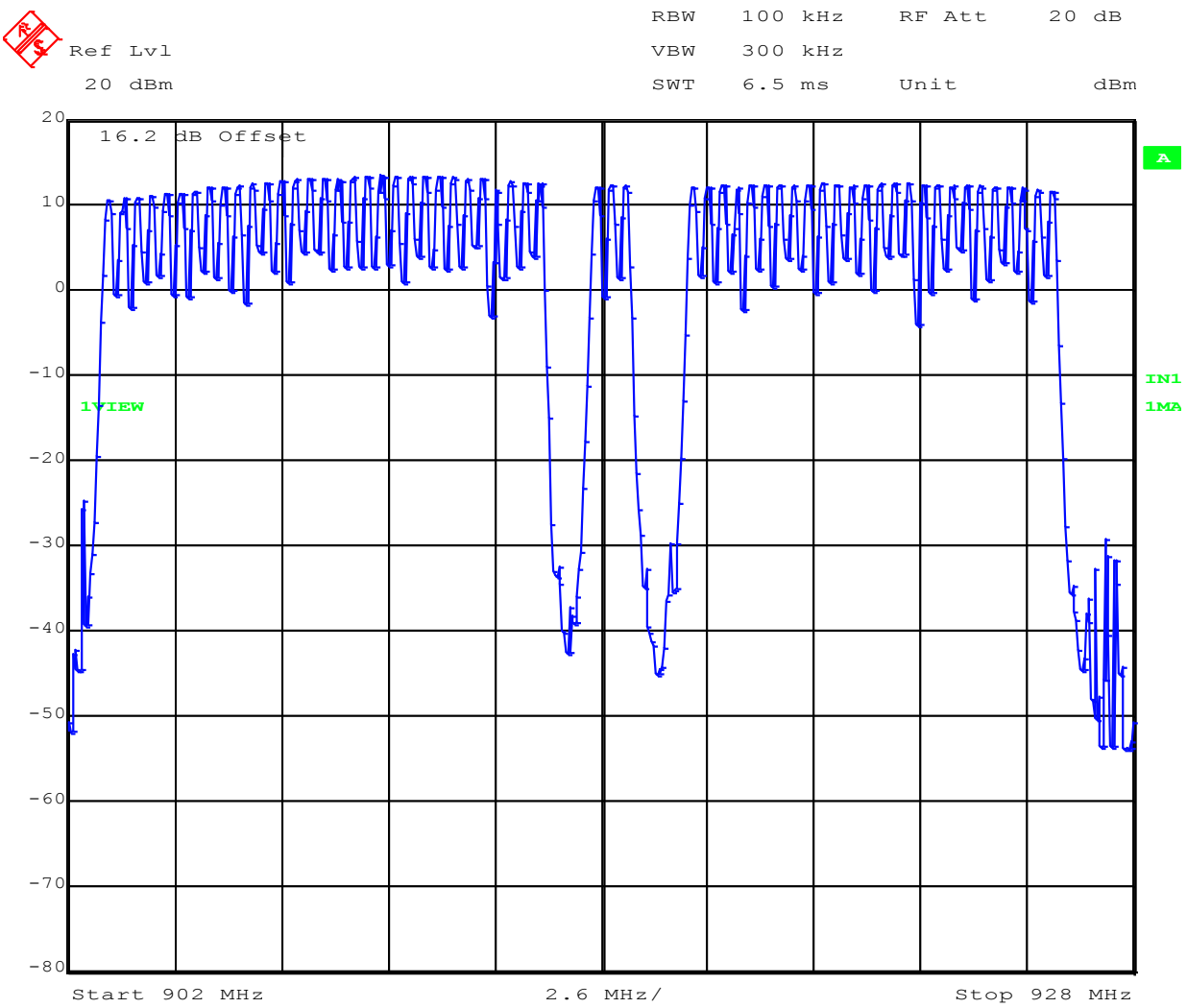
9.2.4. Channel Occupancy

Equipment Configuration for Channel Occupancy			
Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

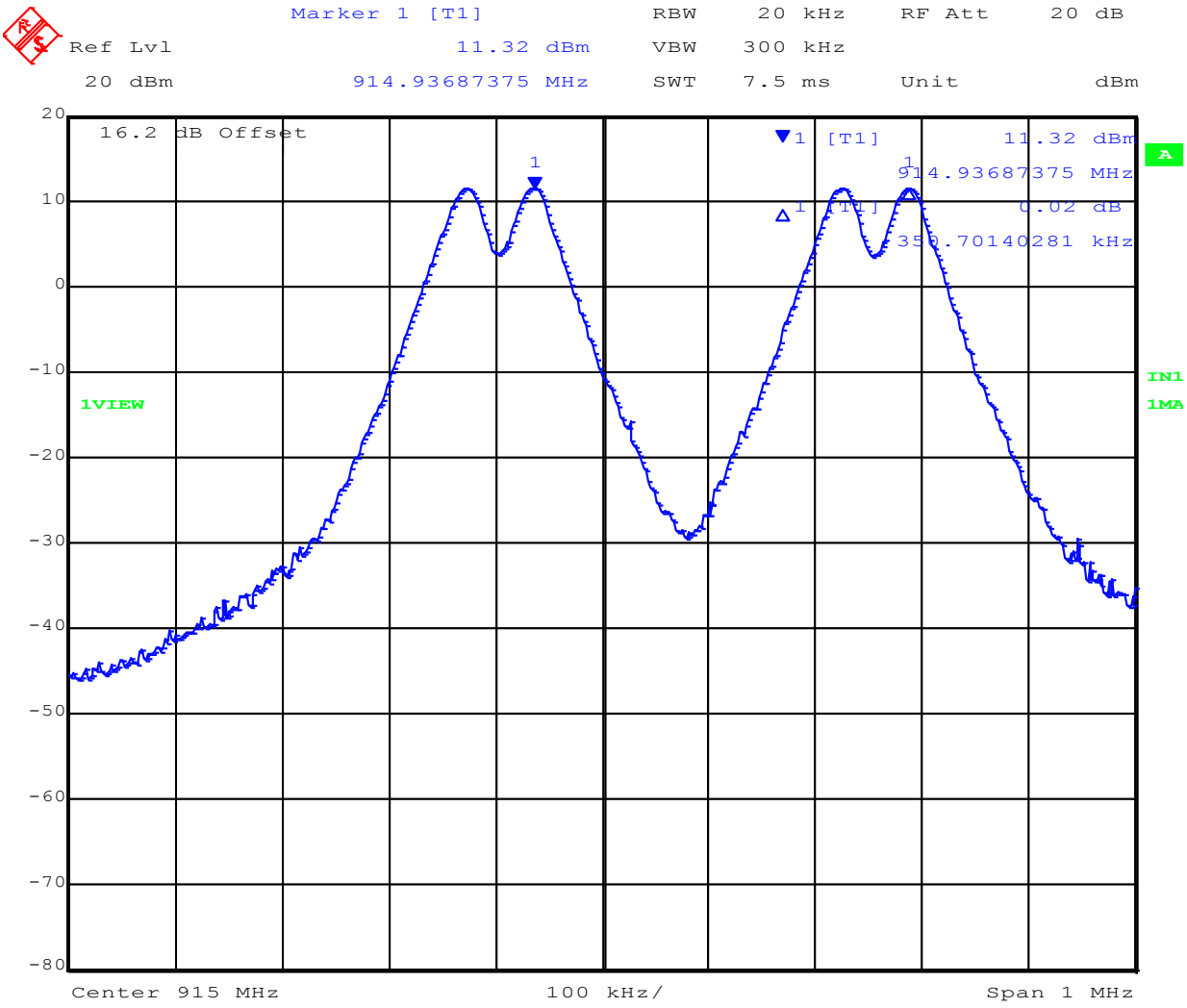
Test Measurement Results

Modulation	Number of Hops in 10 seconds	Dwell Time (ms)	Channel Occupancy (ms)	Limit (ms)	Compliant
25 Kbit/s	1	11.567	11.567	400.0	√

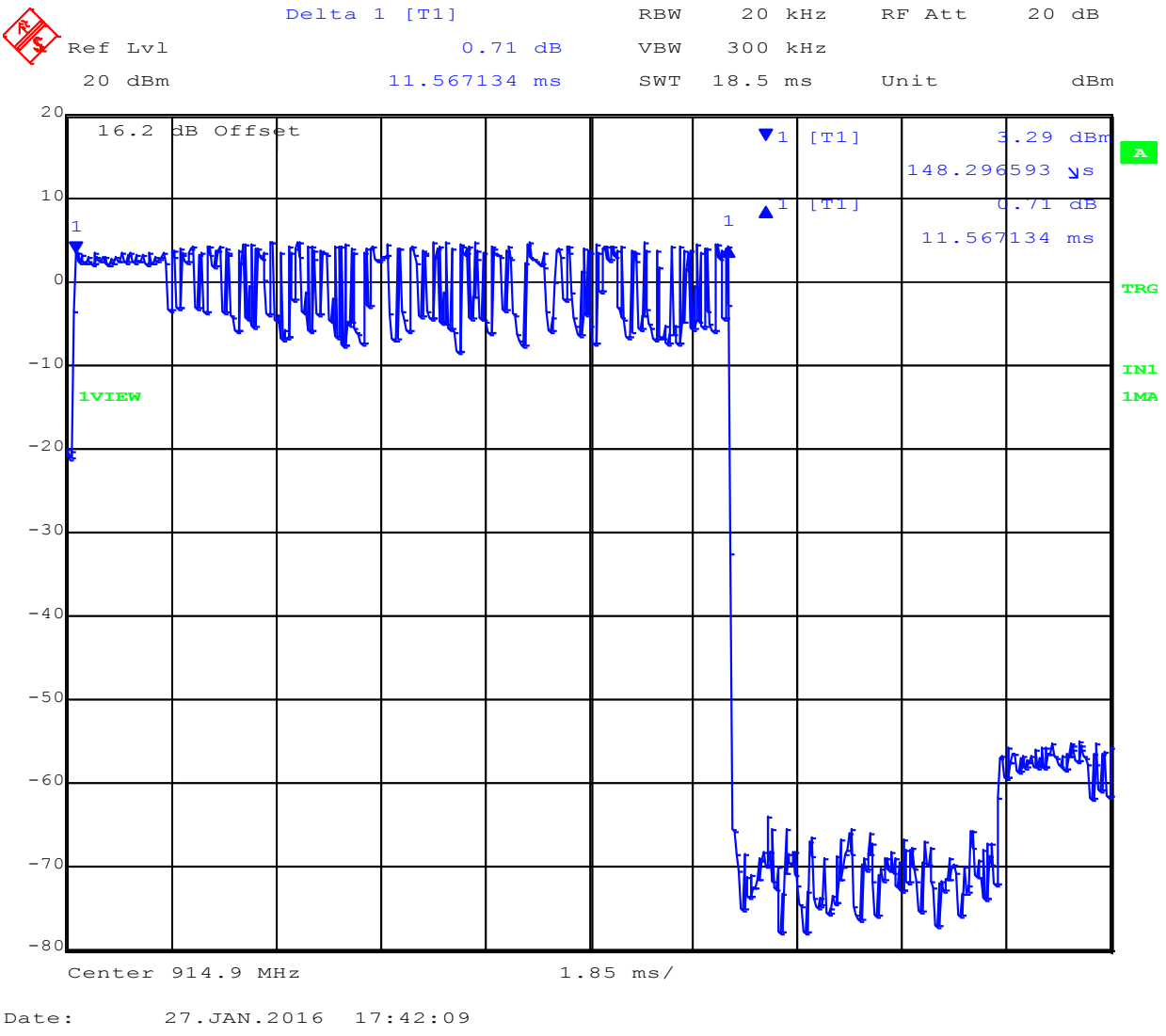
No. of Hopping Channels



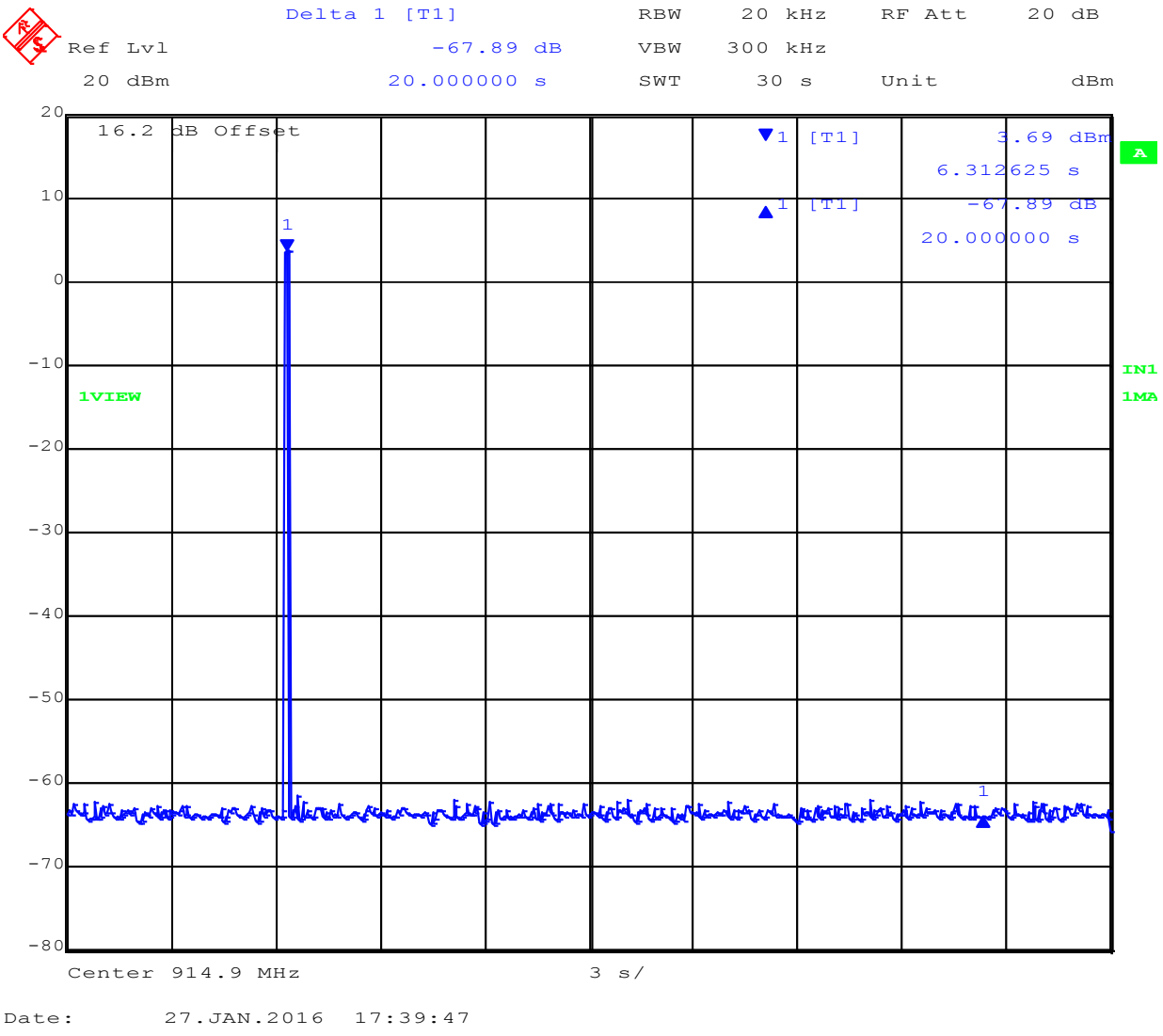
Channel Spacing



Dwell Time



Channel Occupancy



9.3. Conducted Output Power

FCC, Part 15 Subpart C §15.247(b)(2)
Industry Canada RSS-247

Test Procedure
The transmitter terminal of EUT was set for CW (continuous wave) operation and connected to the input of the power meter which was calibrated to measure power. The value of measured power including antenna cable loss was reported.

15.247 (c) Operation with directional antenna gains greater than 6 dBi.
If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Section 7 Test Equipment Configurations - Conducted identifies the test configuration used to prove compliance

Equipment Configuration for Peak Output Power			
Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
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	dBm	
902.92	8.76				8.76	30.00	-21.24	1.0
914.82	9.20				9.20	30.00	-20.80	1.0
925.92	8.96				8.96	30.00	-21.04	1.0

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

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

9.4. Conducted Spurious Emissions

FCC, Part 15 Subpart C §15.247(d)
Industry Canada RSS-247

Test Procedure

Conducted emissions were measured at a limit of 20 dB below the highest in-band spectral density measured with a spectrum analyzer connected to the antenna terminal. Emissions at the band edge were measured and recorded. Measurements were made while EUT was operating in transmit mode of operation at the appropriate center frequency.

Section 4.1 Conducted RF Emission Test Set-up identifies the test configuration

9.4.1. Conducted Spurious Emissions

Equipment Configuration for Transmitter Conducted Spurious Emissions			
Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

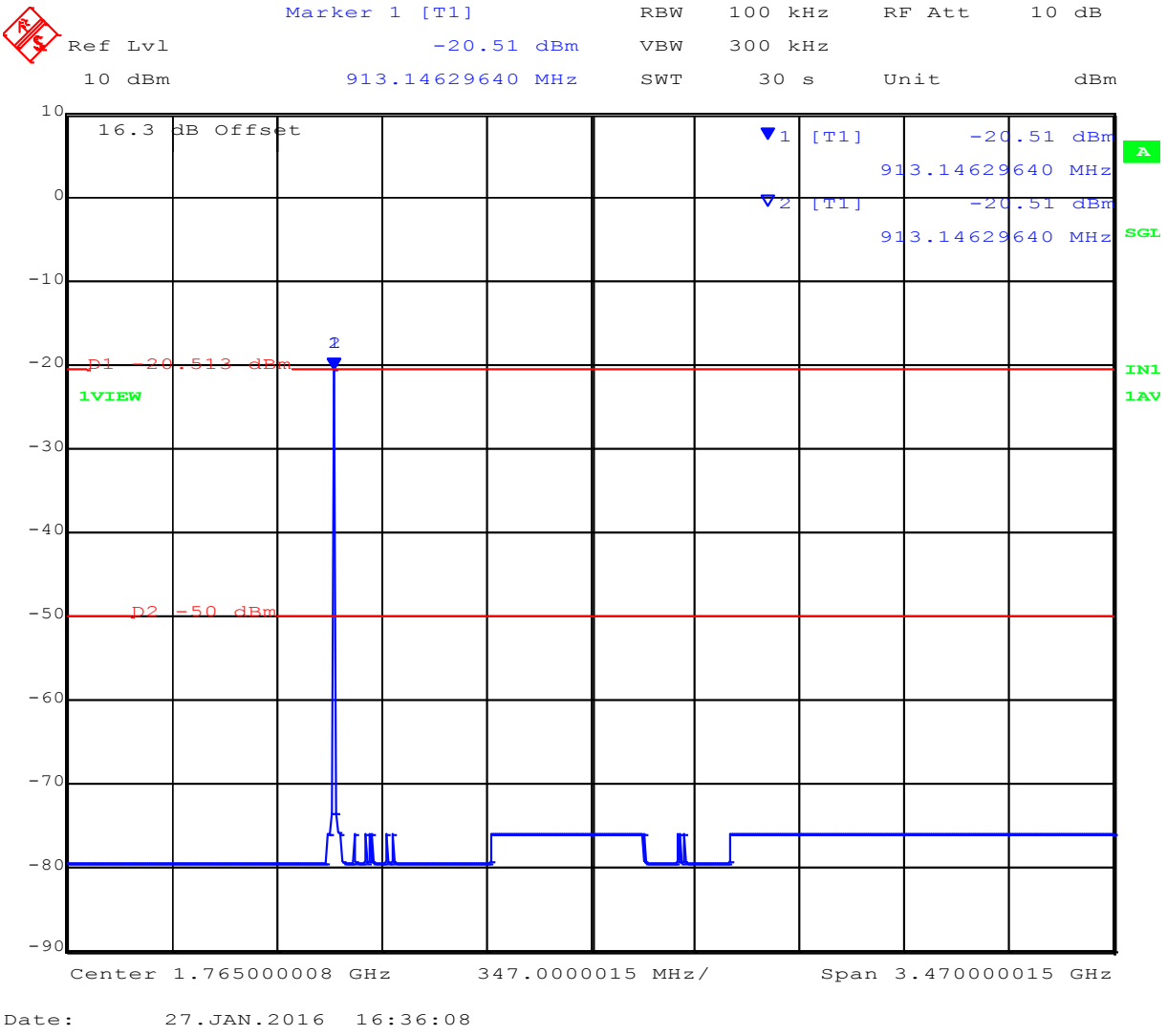
Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
902.92	30.0 - 10000.0	-76.25	-50.00						
914.82	30.0 - 10000.0	-75.76	-50.00						
925.92	30.0 - 10000.0	-76.99	-50.00						

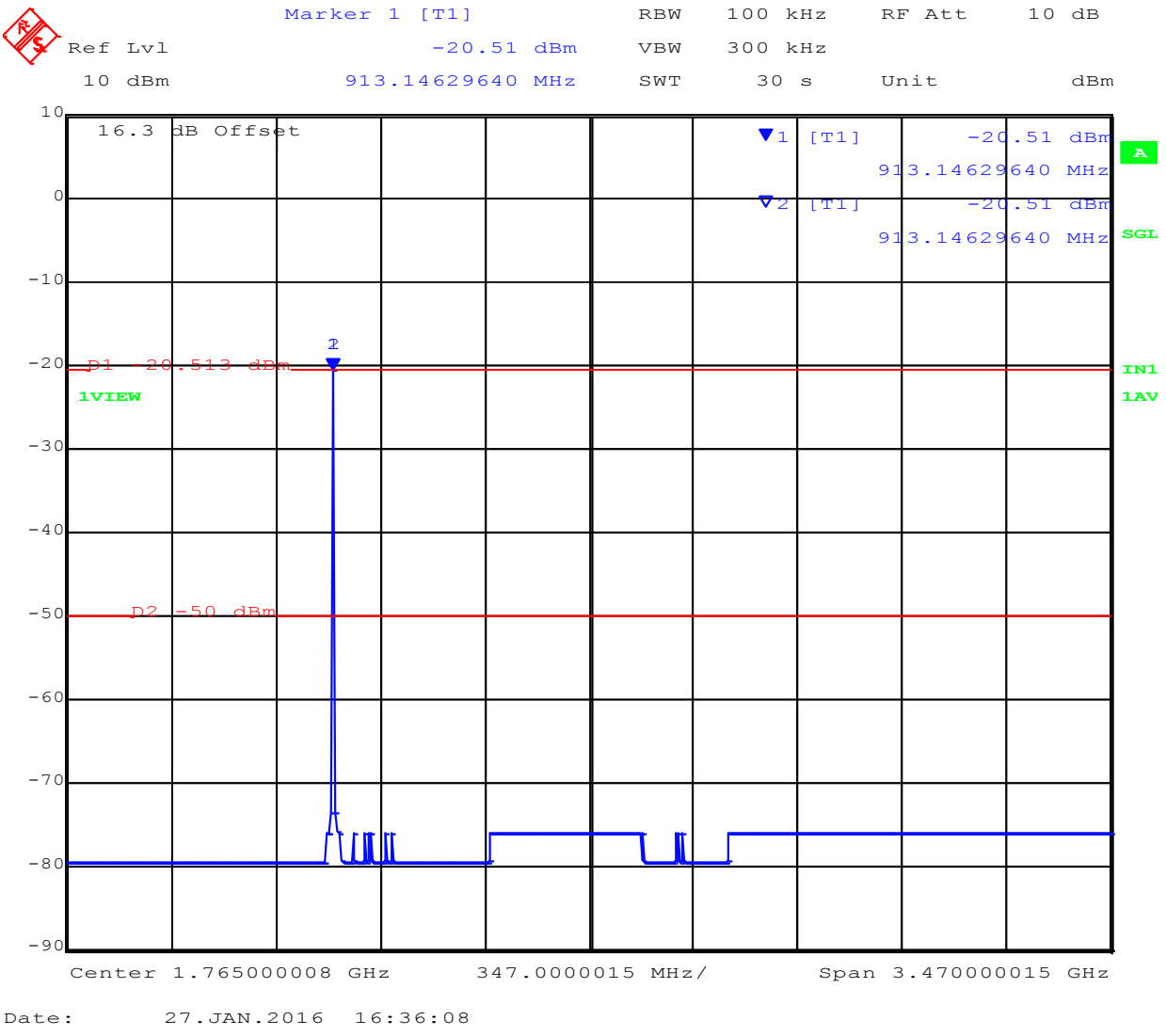
Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

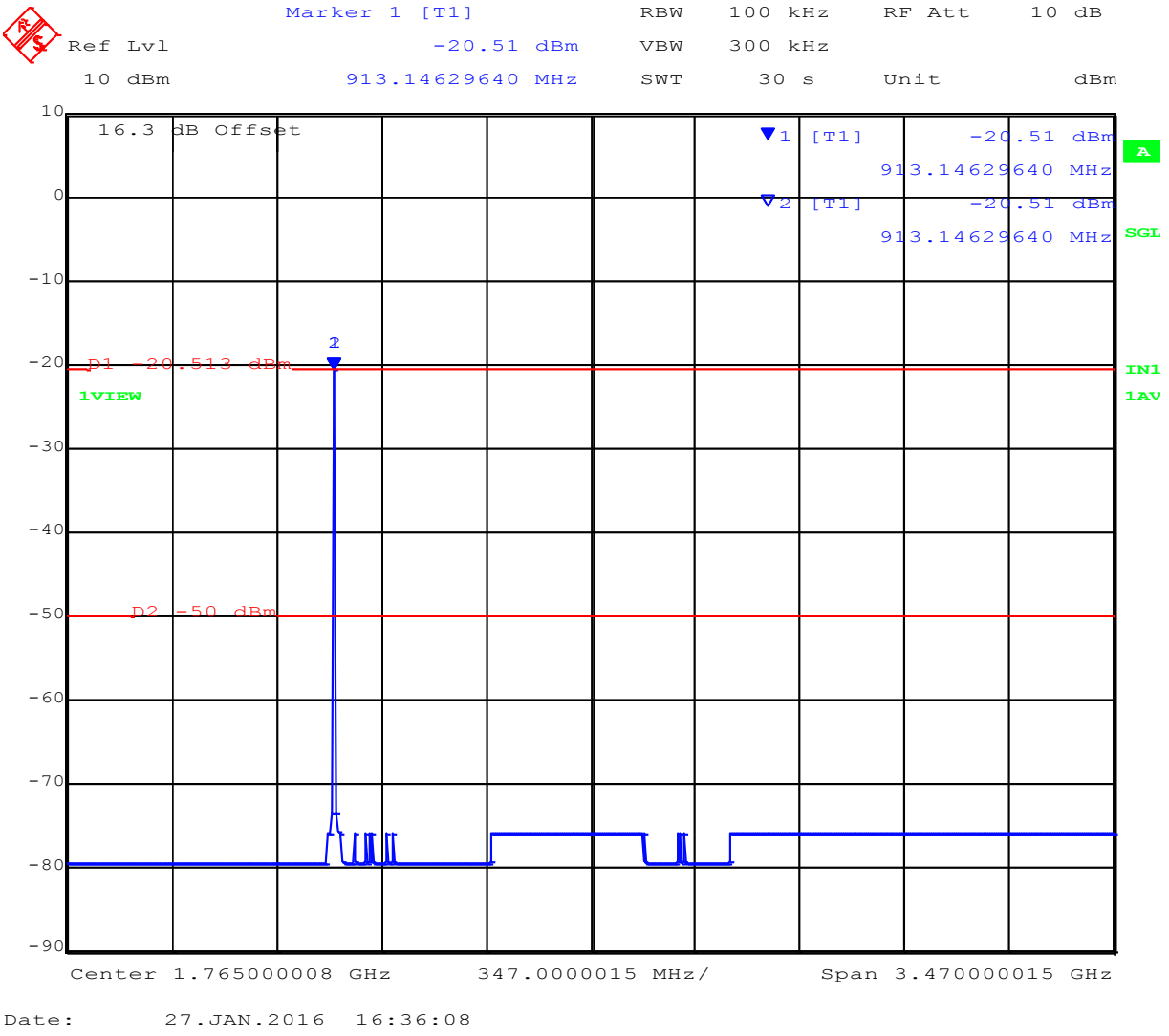
Low Channel Conducted Spurious Emissions



Mid Channel Conducted Spurious Emissions



High Channel Conducted Spurious Emissions



9.4.2. Conducted Band-Edge Emissions

Equipment Configuration for Conducted Low Band-Edge Emissions

Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	902.92 MHz
Band-Edge Frequency:	902.00 MHz
Test Frequency Range:	890.0 - 905.0 MHz

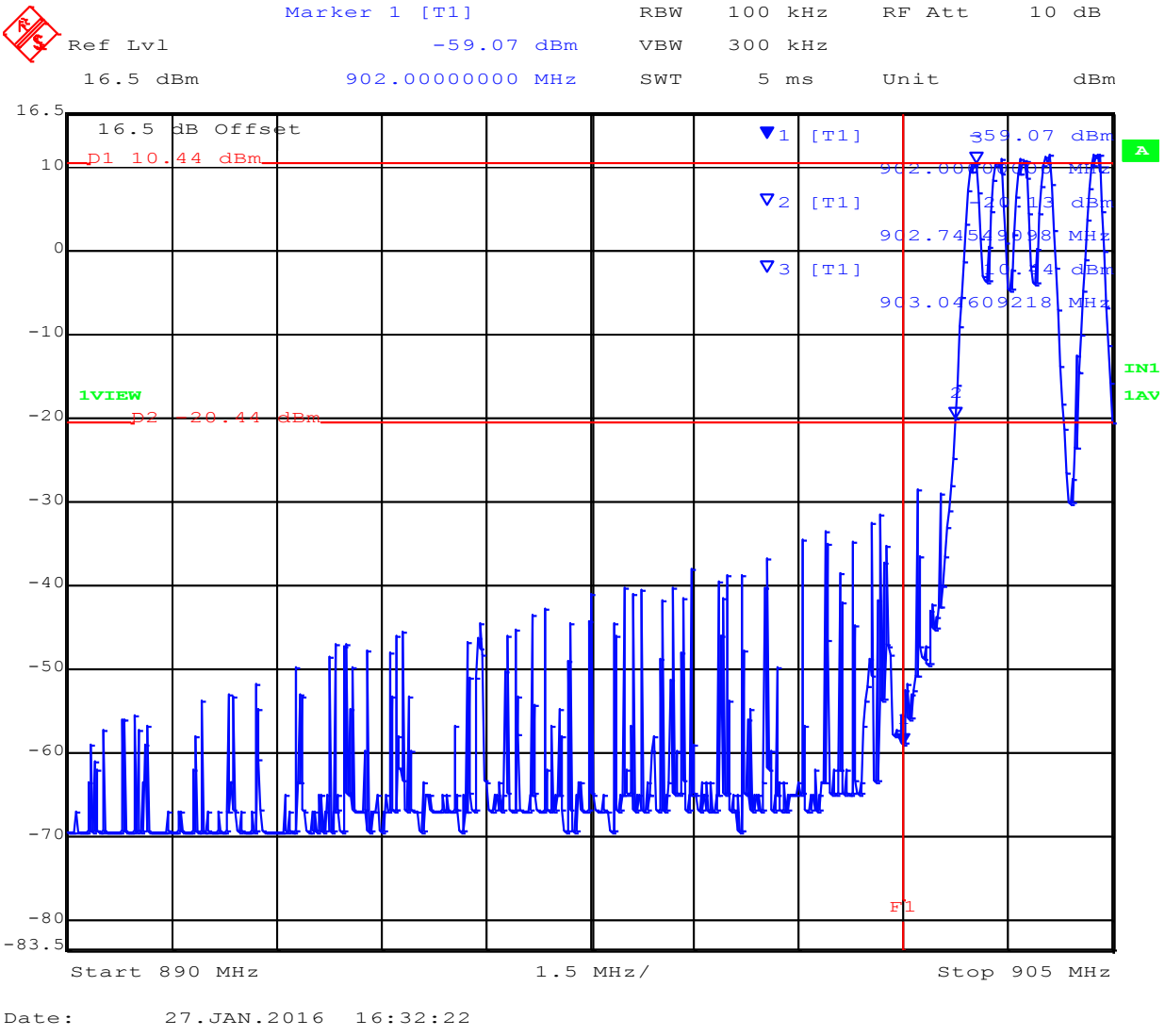
Operational Mode	Band-Edge Markers and Limit			Revised Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
Hopping	-59.07	-20.44	902.75	--	--	-38.63
Static	-53.50	-21.10	902.75	--	--	-32.40

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

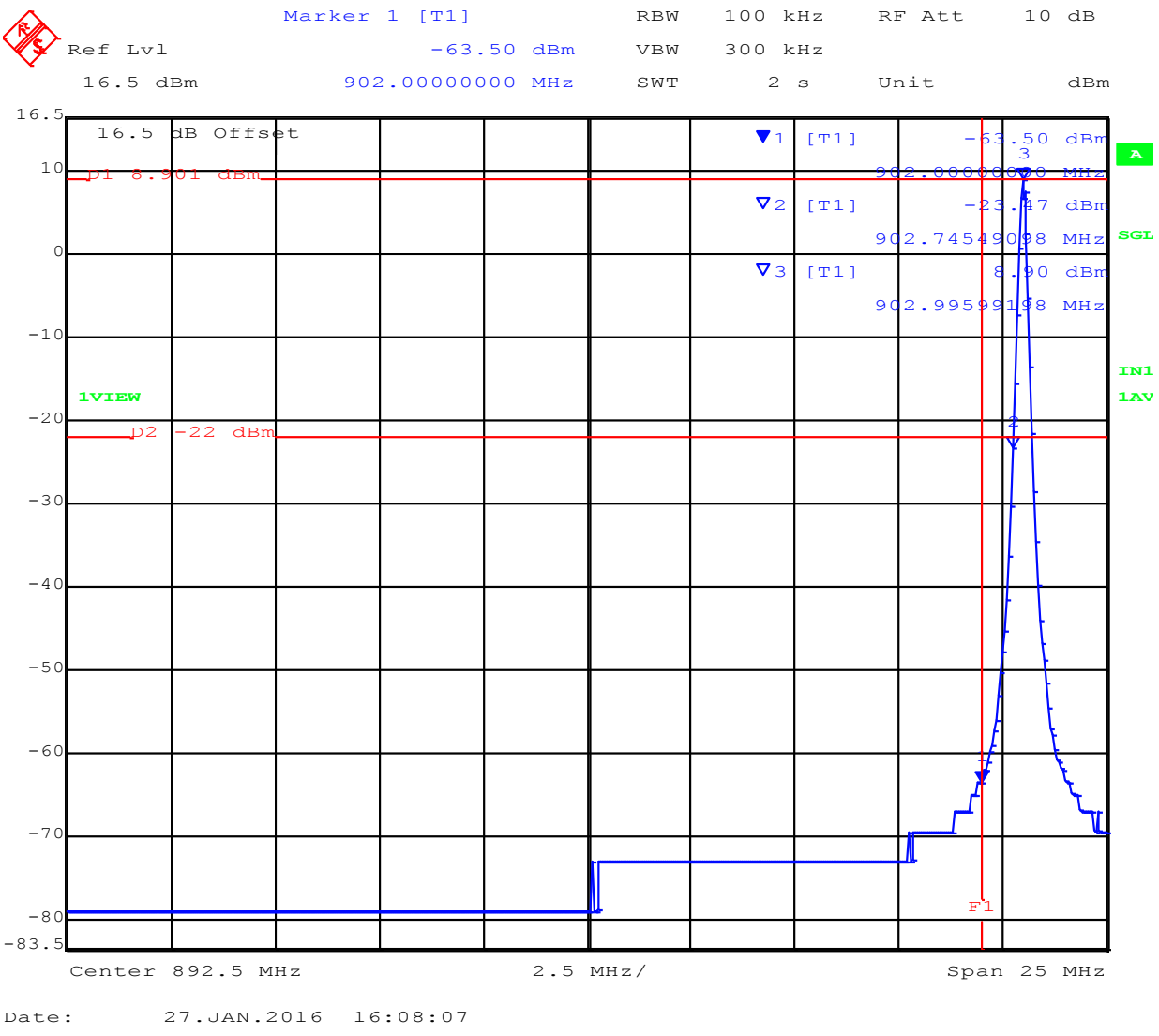
Note: click the links in the above matrix to view the graphical image (plot).

Conducted Low Band-Edge Emissions

Hopping



Static Single Channel



Equipment Configuration for Conducted High Band-Edge Emissions

Variant:	FHSS	**Duty Cycle (%):**	100
Data Rate:	25 KBit/s	**Antenna Gain (dBi):**	1.3
Modulation:	GFSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	925.92 MHz
Band-Edge Frequency:	928.00 MHz
Test Frequency Range:	925.0 - 935.0 MHz

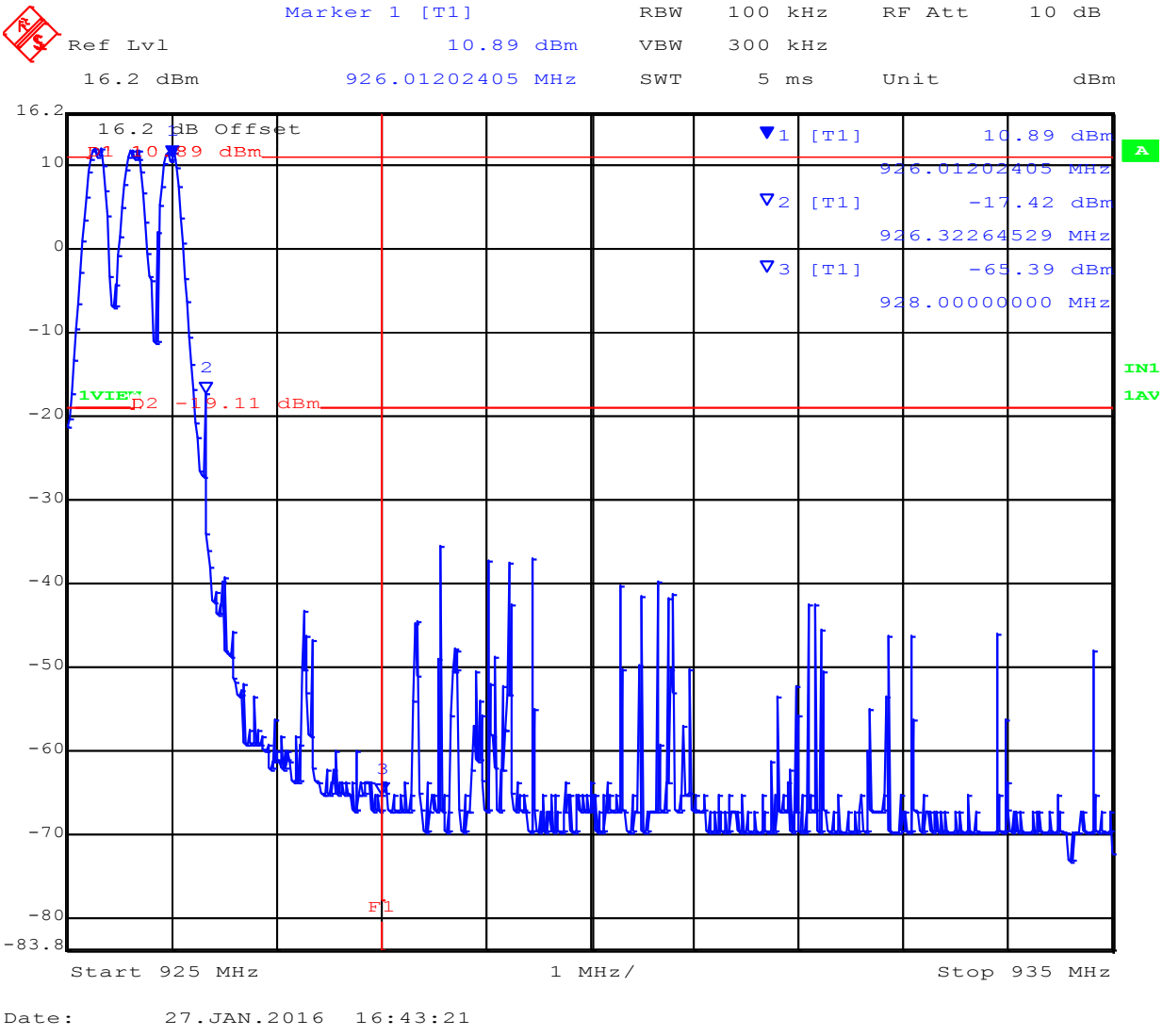
Operational Mode	**Band-Edge Markers and Limit**			**Revised Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
Hopping	-65.39	-19.11	926.32	--	--	-46.28
Static	-65.39	-19.11	926.32	--	--	-46.28

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

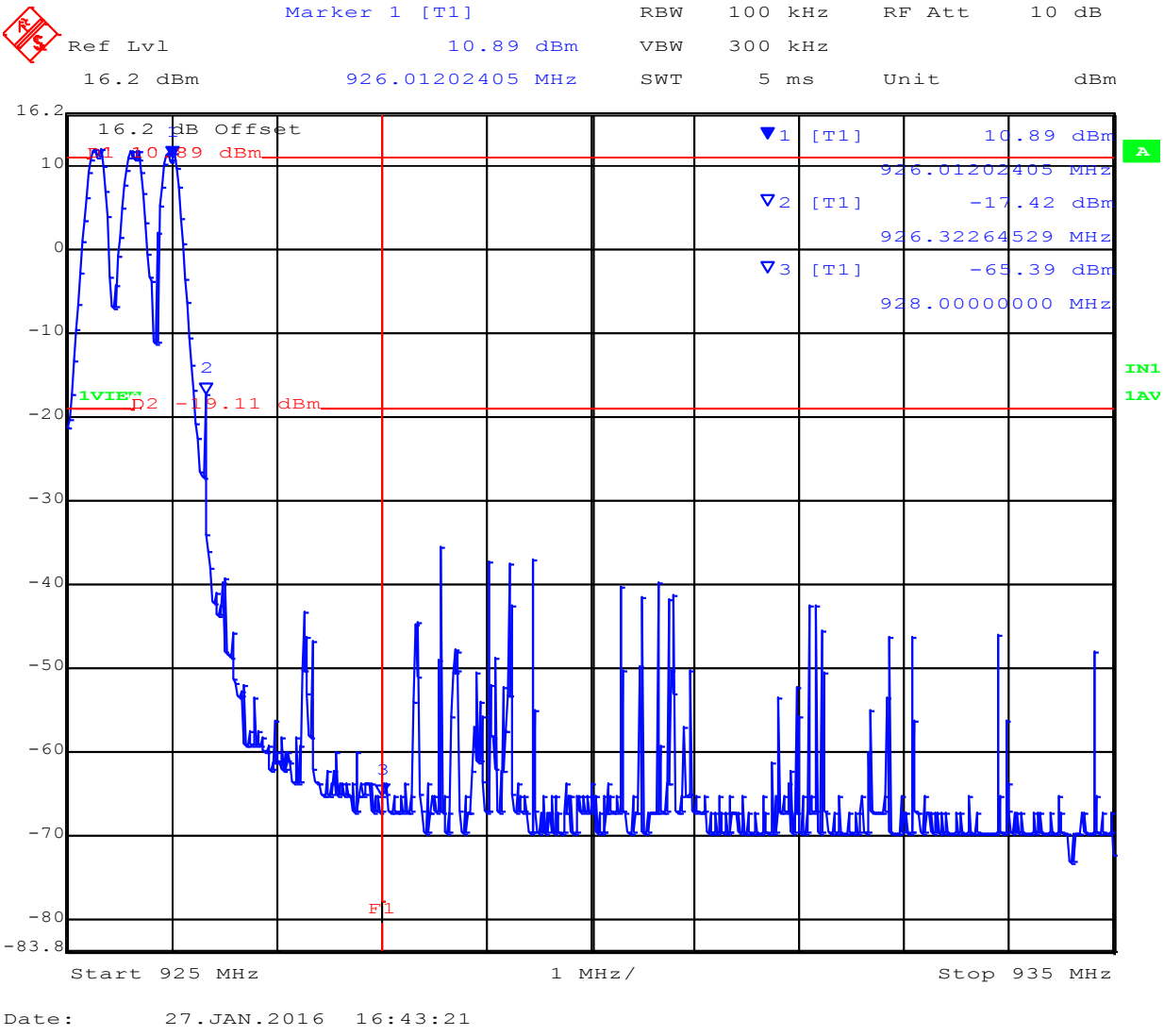
Note: click the links in the above matrix to view the graphical image (plot).

Conducted High Band-Edge Emissions

Hopping



Static Single Channel



9.5. Emissions

9.5.1. Radiated Emissions

Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions (Restricted Bands)			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Radiated Spurious and Band-Edge Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.205, 15.209	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)
Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

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.

(d) The following devices are exempt from the requirements of this section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to §15.213.

(4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of subparts D or F of this part.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).

Time Averaged Duty Cycle Correction Factor

Client declared Time Averaged Duty Cycle Correction Factor (DCCF)
Maximum transmit time within 100mS period: 23.68 mS
Typical transmit time within 100mS period: 11.567 mS

Using Typical Transmit Time
Correction Factor: 20 * Log (11.567/100) = -18.74 dB
Corrected Value = Measured Value (dB) – 18.74 (dB)
Level (dBµV/m) = Raw + Cable Loss + AF + Correction Factor

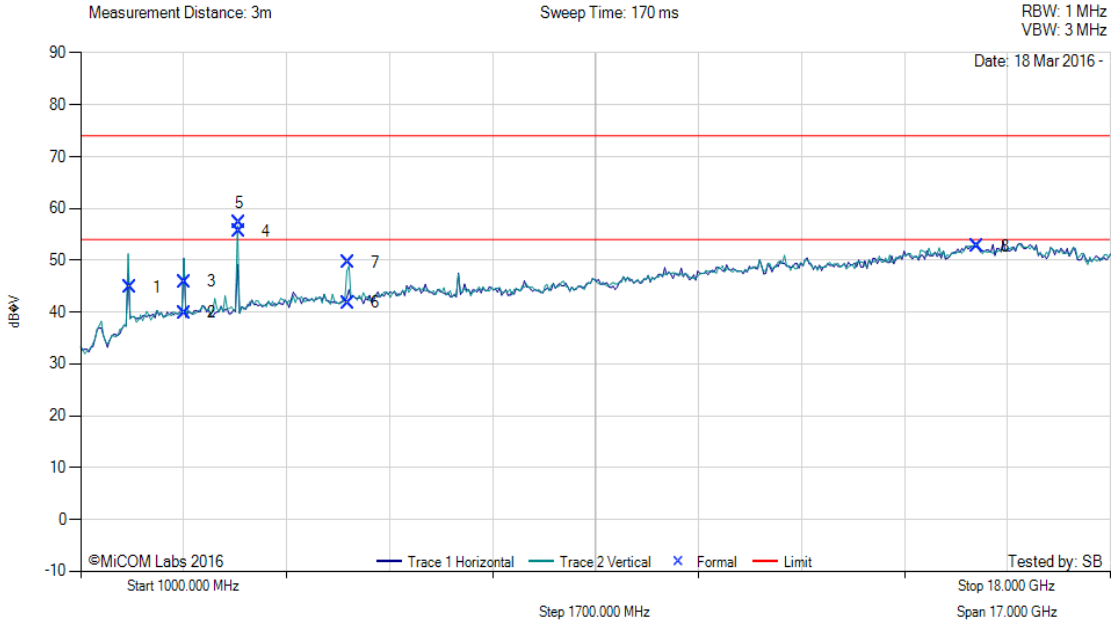
Restricted Band Emissions

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	integral	**Variant:**	TW-160B-P
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	903.00	**Data Rate:**	Not Applicable
Power Setting:	1	**Tested By:**	SB

Test Measurement Results

Variant: CW, Test Freq: 903.00 MHz, Antenna: integral, Power Setting: 1, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1806.25	55.97	2.45	-13.63	44.79	Peak (NRB)	Horizontal	101	0	--	--	Pass
2	2708.82	48.33	2.86	-11.37	39.82	Max Avg	Vertical	180	240	54.0	-14.2	Pass
3	2708.82	54.33	2.86	-11.37	45.82	Max Peak	Vertical	180	240	74.0	-28.2	Pass
4	3612.03	63.52	3.13	-11.14	55.51	Max Avg	Vertical	117	339	54.0	-17.2	Pass*
5	3612.03	65.36	3.13	-11.14	57.35	Max Peak	Vertical	117	339	74.0	-16.7	Pass
6	5418.24	49.27	3.73	-11.18	41.82	Max Avg	Vertical	197	21	54.0	-12.2	Pass
7	5418.24	57.02	3.73	-11.18	49.57	Max Peak	Vertical	197	21	74.0	-24.4	Pass
8	15804.77	46.68	5.96	0.05	52.69	Peak (Scan)	Vertical	101	0	74.0	-21.3	Pass

Test Notes: Max Power on EUT. Vertically faced towards RX antenna.

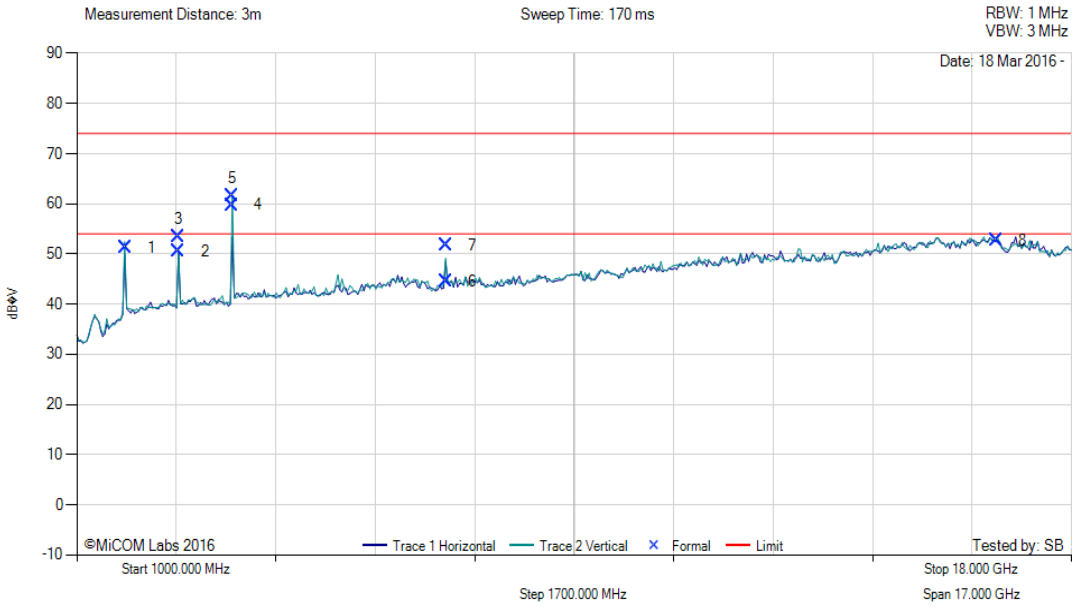
*Modified correction factor employed

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	integral	**Variant:**	TW-160B-P
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	914.90	**Data Rate:**	Not Applicable
Power Setting:	1	**Tested By:**	SB

Test Measurement Results

Variant: CW, Test Freq: 914.90 MHz, Antenna: integral, Power Setting: 1, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1827.14	62.31	2.45	-13.55	51.21	Peak (NRB)	Vertical	101	0	--	--	Pass
2	2740.56	59.07	2.85	-11.35	50.57	Max Avg	Horizontal	140	360	54.0	-3.4	Pass
3	2740.56	61.88	2.85	-11.35	53.38	Max Peak	Horizontal	140	360	74.0	-20.6	Pass
4	3654.06	67.61	3.16	-11.05	59.72	Max Avg	Vertical	106	5	54.0	-13.04	Pass*
5	3654.06	69.49	3.16	-11.05	61.60	Max Peak	Vertical	106	5	74.0	-12.4	Pass
6	7307.86	47.64	4.24	-7.29	44.59	Max Avg	Vertical	117	351	54.0	-9.4	Pass
7	7307.86	54.75	4.24	-7.29	51.70	Max Peak	Vertical	117	351	74.0	-22.3	Pass
8	16715.31	44.98	6.11	1.56	52.65	Peak (NRB)	Vertical	101	0	--	--	Pass

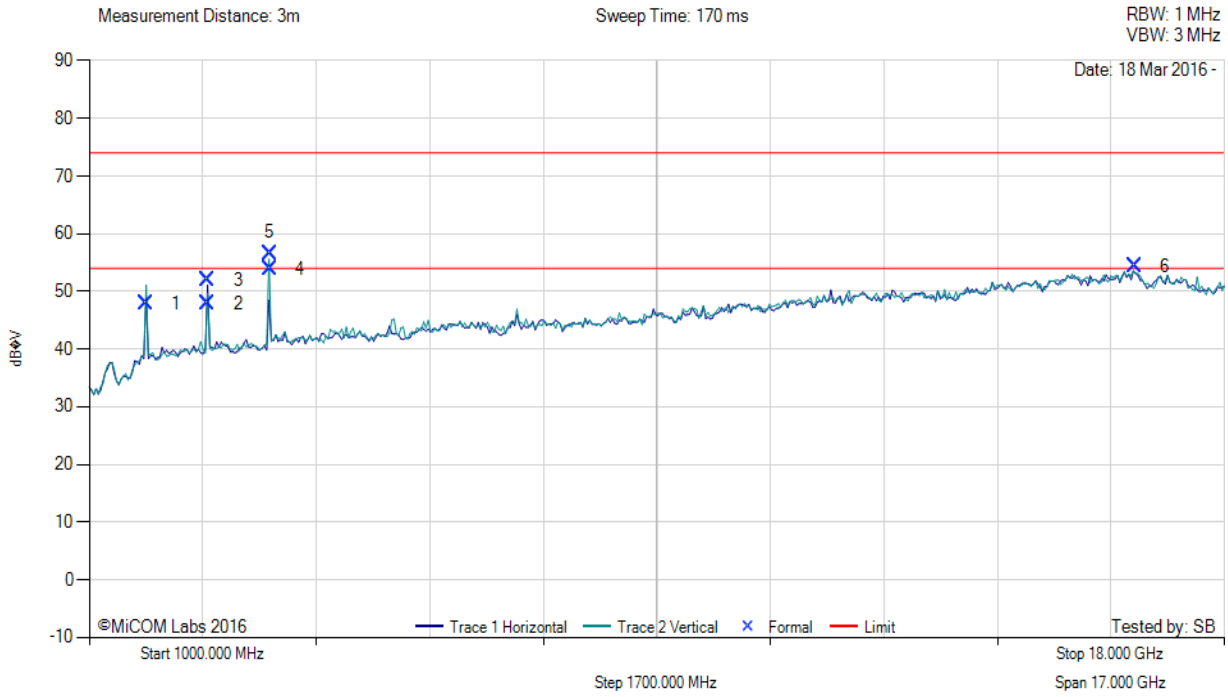
Test Notes: Max Power on EUT. Vertically faced towards RX antenna.
*Modified correction factor employed

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	integral	**Variant:**	TW-160B-P
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.00	**Data Rate:**	Not Applicable
Power Setting:	1	**Tested By:**	SB

Test Measurement Results

Variant: CW, Test Freq: 926.00 MHz, Antenna: integral, Power Setting: 1, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1852.14	58.82	2.48	-13.44	47.86	Peak (NRB)	Vertical	101	0	--	--	Pass
2	2778.15	56.45	2.84	-11.33	47.96	Max Avg	Horizontal	152	5	54.0	-6.0	Pass
3	2778.15	60.43	2.84	-11.33	51.94	Max Peak	Horizontal	152	5	74.0	-22.1	Pass
4	3703.84	61.71	3.18	-10.94	53.95	Max Avg	Vertical	100	4	54.0	-0.1	Pass
5	3703.84	64.43	3.18	-10.94	56.67	Max Peak	Vertical	100	4	74.0	-17.3	Pass
6	16650.78	46.66	6.07	1.58	54.31	Peak (NRB)	Vertical	101	0	--	--	Pass

Test Notes: Max Power on EUT. Vertically faced towards RX antenna.

9.5.2. Digital Emissions

Radiated Test Conditions for Radiated Digital Emissions (0.03 – 1 GHz)			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Digital Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.209	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Digital Emissions (0.03 – 1 GHz)
Testing 30M-1 GHz was performed in a 3-meter 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 closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. 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.

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 – 1 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

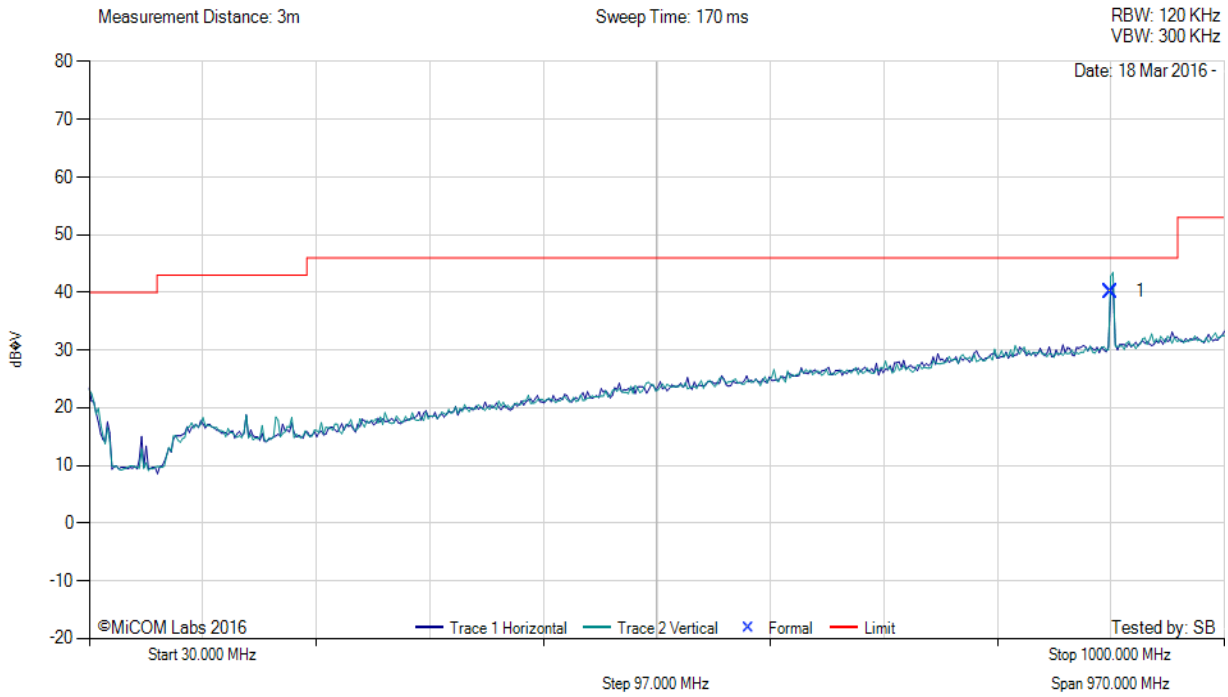
**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this 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.

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	integral	**Model:**	TW-160B-P
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	903.00	**Data Rate:**	Not Applicable
Power Setting:	1	**Tested By:**	SB

Test Measurement Results

Variant: CW, Test Freq: 903.00 MHz, Antenna: integral, Power Setting: 1, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	902.93	41.60	6.34	-7.75	40.19	Fundamental	Vertical	100	1	--	--	

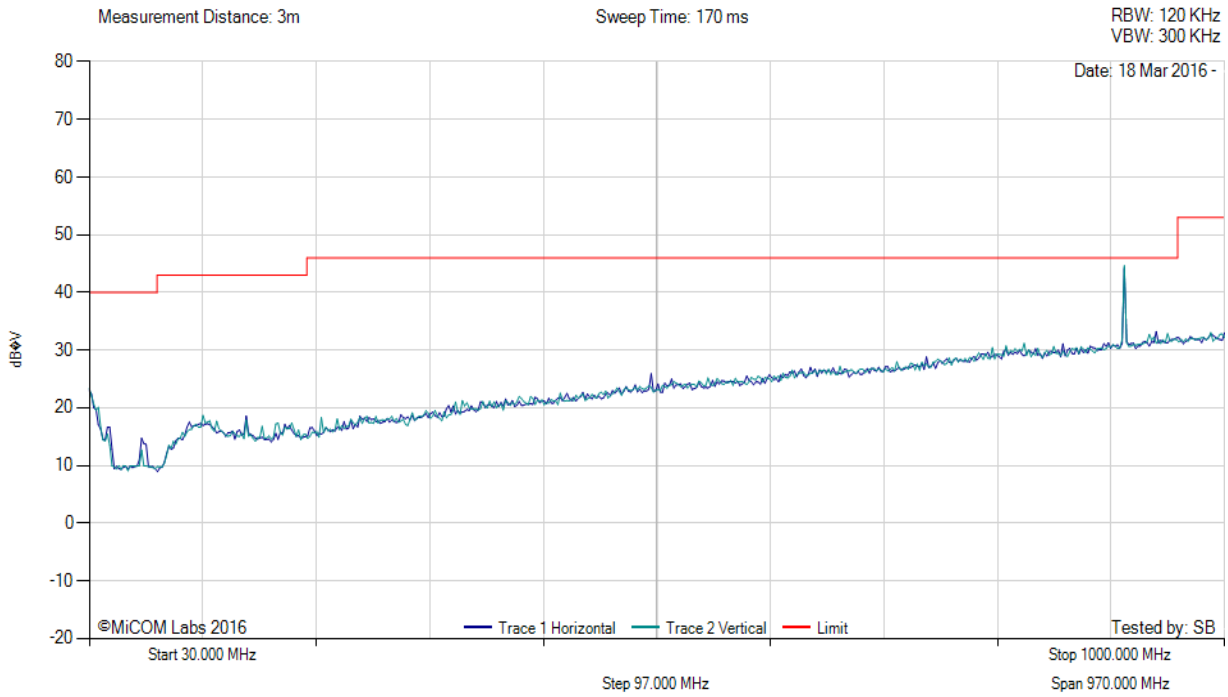
Test Notes: Max Power on EUT. Vertically faced towards RX antenna. Low Power

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	integral	**Model:**	TW-160B-P
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	914.90	**Data Rate:**	Not Applicable
Power Setting:	1	**Tested By:**	SB

Test Measurement Results

Variant: CW, Test Freq: 914.90 MHz, Antenna: integral, Power Setting: 1, Duty Cycle (%): 99



There are no emissions found within 6dB of the limit line, the emission closest to the limit line is the fundamental

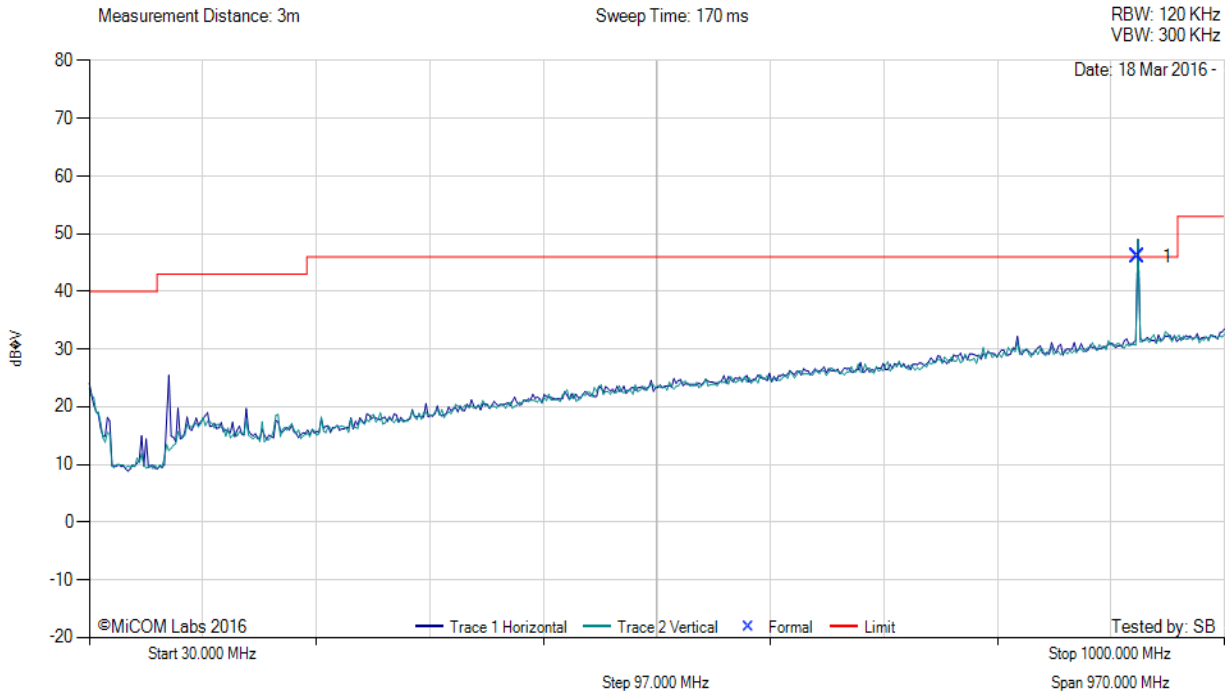
Test Notes: Max Power on EUT. Vertically faced towards RX antenna. Low Power

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	integral	**Model:**	TW-160B-P
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.00	**Data Rate:**	Not Applicable
Power Setting:	1	**Tested By:**	SB

Test Measurement Results

Variant: CW, Test Freq: 926.00 MHz, Antenna: integral, Power Setting: 1, Duty Cycle (%): 99



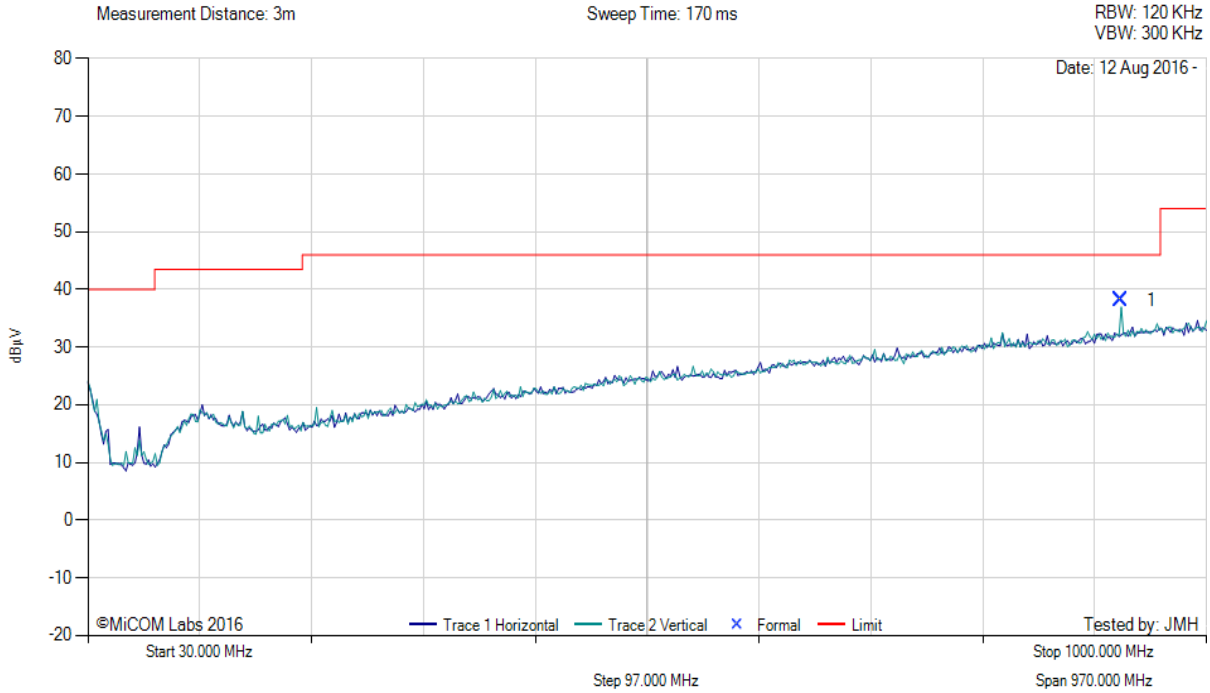
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	925.93	47.12	6.44	-7.58	45.98	Fundamental	Vertical	100	0	--	--	

Test Notes: Max Power on EUT. Vertically faced towards RX antenna. Low Power

Equipment Configuration for Radiated Digital Emissions (0.03 - 1 GHz) Class B			
Antenna:	Integral	**Model:**	TW-165B-E
Antenna Gain (dBi):	1.3	**Modulation:**	CW Mode
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	926.00	**Data Rate:**	Not Applicable
Power Setting:	Max	**Tested By:**	JMH

Test Measurement Results

Variant: Dig Em, Test Freq: 926.00 MHz, Antenna: Integral, Power Setting: NA, Duty Cycle (%): Def

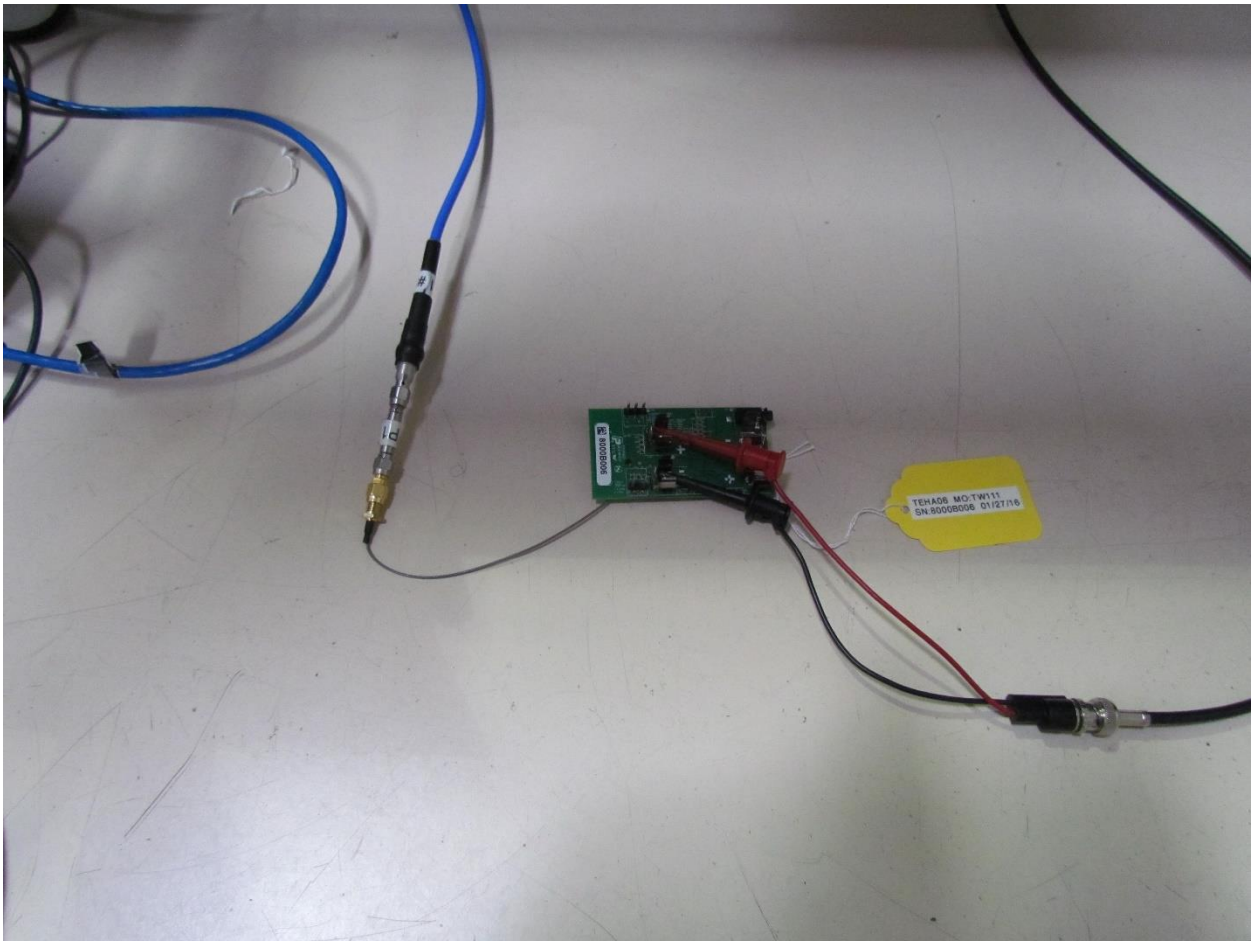


30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	926.03	39.32	6.44	-7.58	38.18	Fundamental	Vertical	100	339	46.0	-7.8	Pass

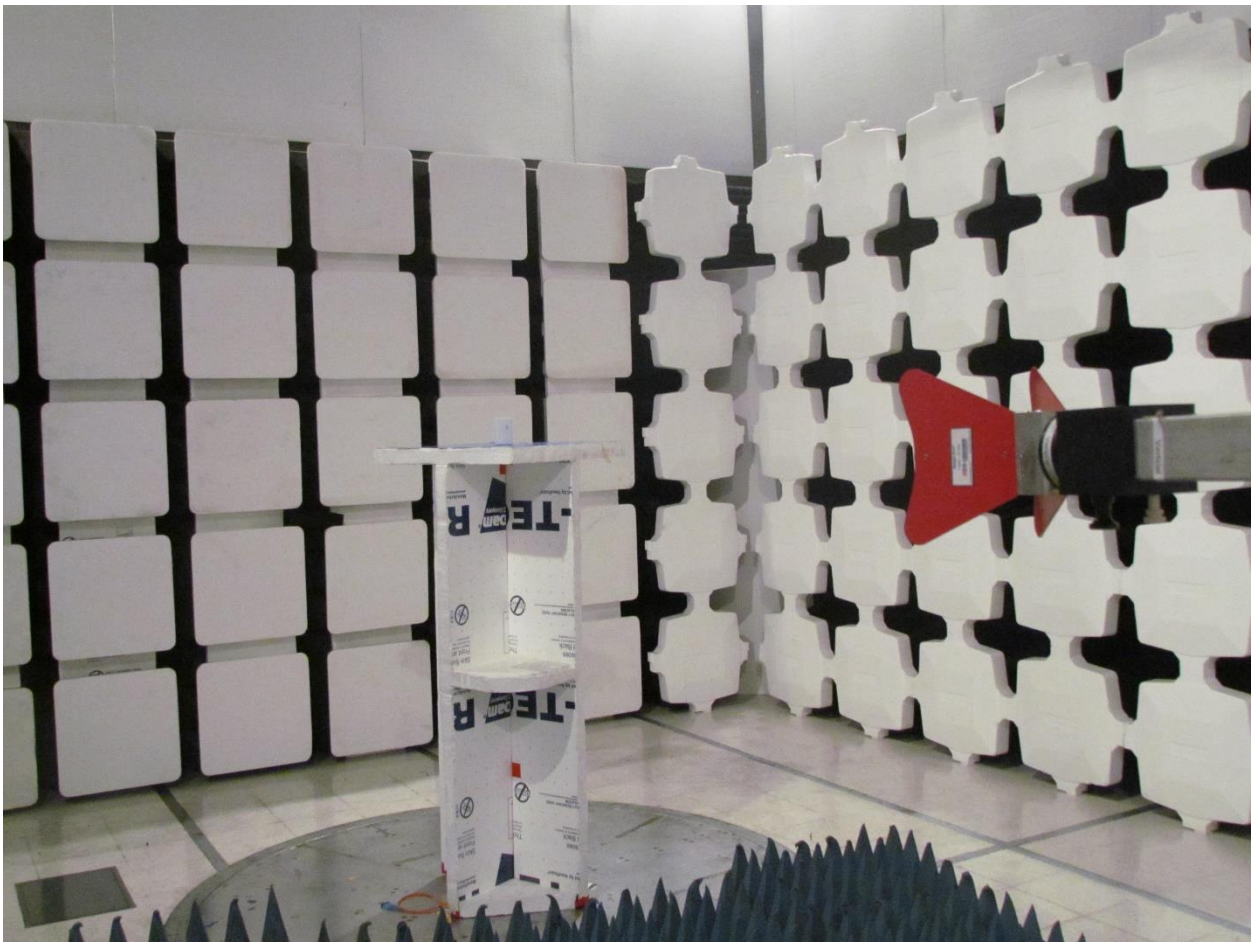
Test Notes: TW-165B-E, LCD Display on, Radio max power ch 59. Battery powered.

10. PHOTOGRAPHS

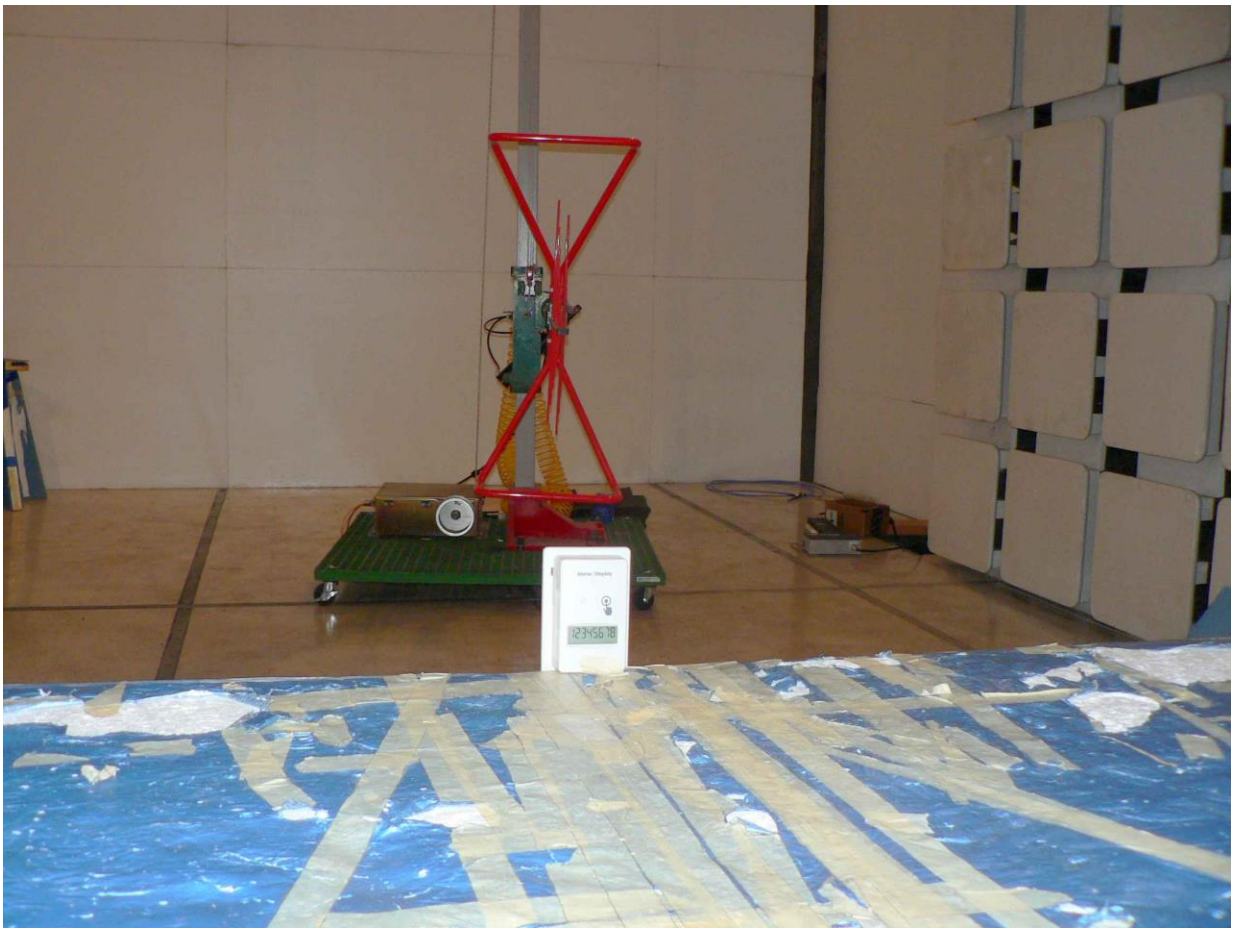
10.1. Conducted Test Setup



10.2. Radiated Test Setup >1GHz



10.3. Digital Emission Test Setup (0.03 – 1 GHz)



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