Nytec Inc.

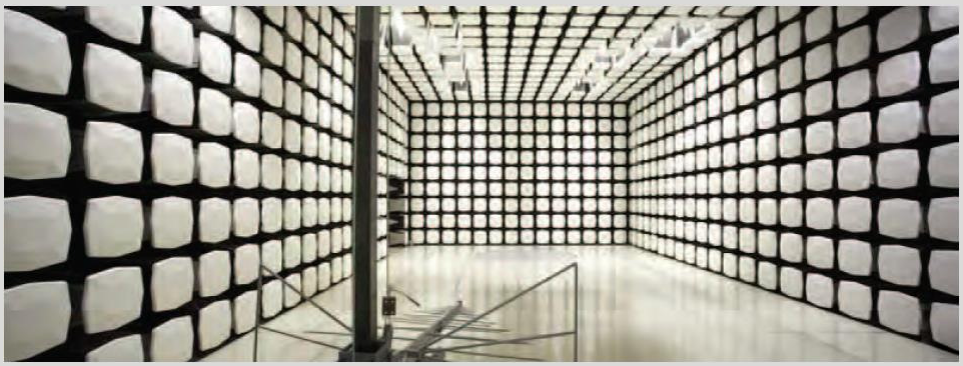
XI Access Panel, Part Number: 40-10146

FCC 15.207:2018

FCC 15.225:2018

13.56 MHz Radio

Report # NYTE0015.6



NVLAP LAB CODE: 200630-0

CERTIFICATE OF TEST

Last Date of Test: May 18, 2018
Nytec Inc.
Model: XI Access Panel, Part Number: 40-10146

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2018	ANSI C63.10:2013
FCC 15.225:2018	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.4	Field Strength of Fundamental	Yes	Pass	
6.4	Field Strength of Spurious Emissions Less Than 30 MHz	Yes	Pass	
6.5	Field Strength of Spurious Emissions Greater Than 30 MHz	Yes	Pass	
6.8	Frequency Stability	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

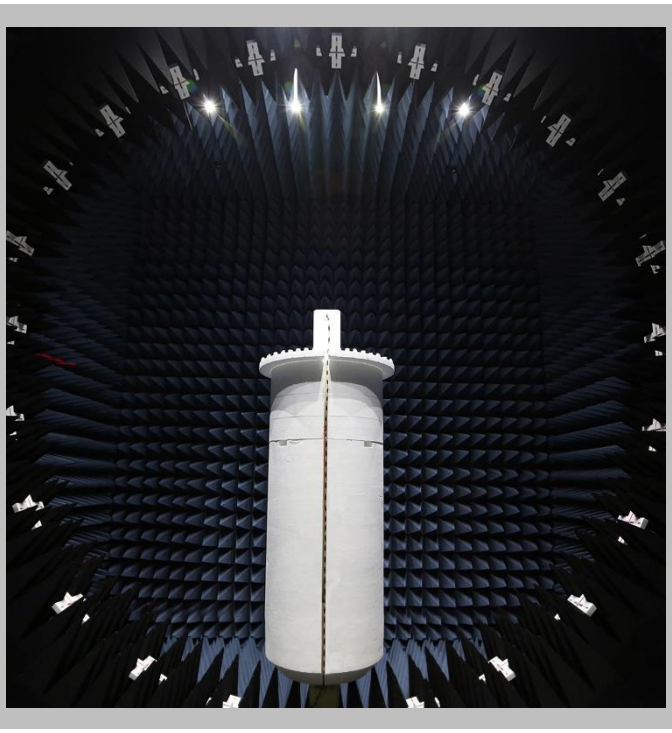
MIC – Recognized by MIC as a CAB for the acceptance of test data.

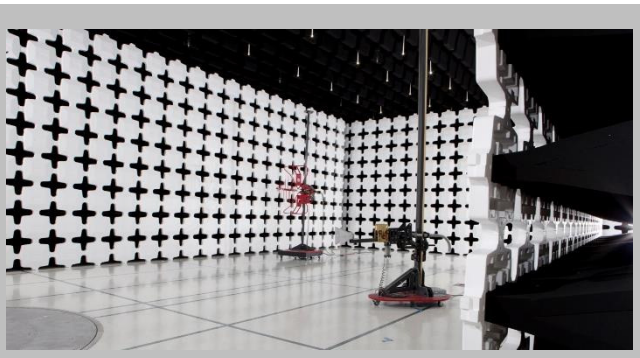
SCOPE

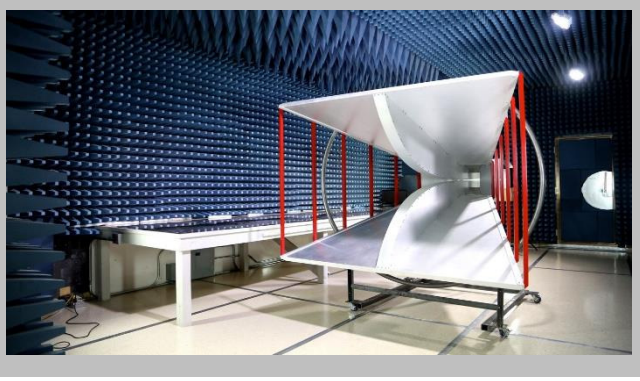
For details on the Scopes of our Accreditations, please visit:
http://portlandcustomer.element.com/ts/scope/scope.htm
http://gsi.nist.gov/global/docs/cabs/designations.html

FACILITIES

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

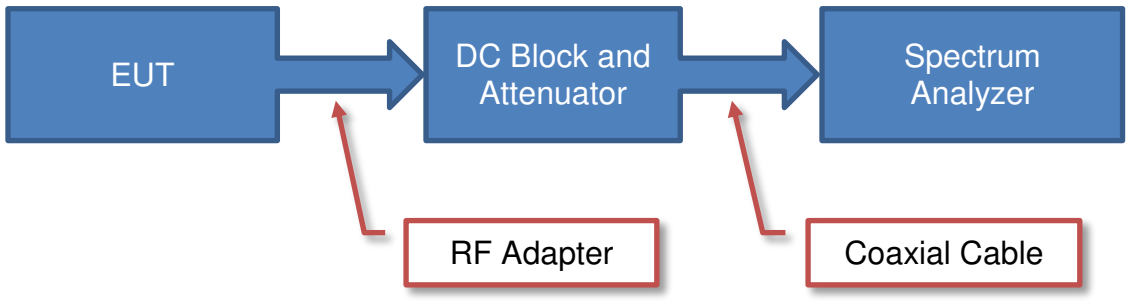
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

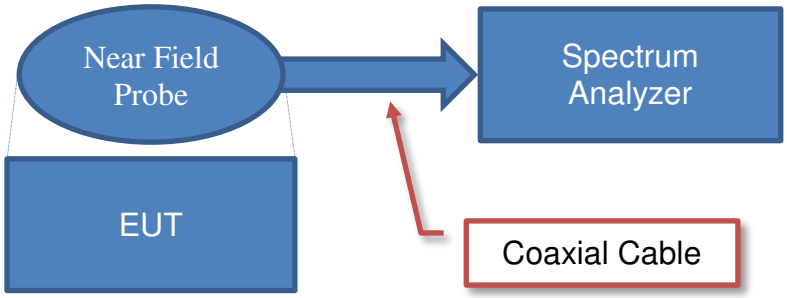
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

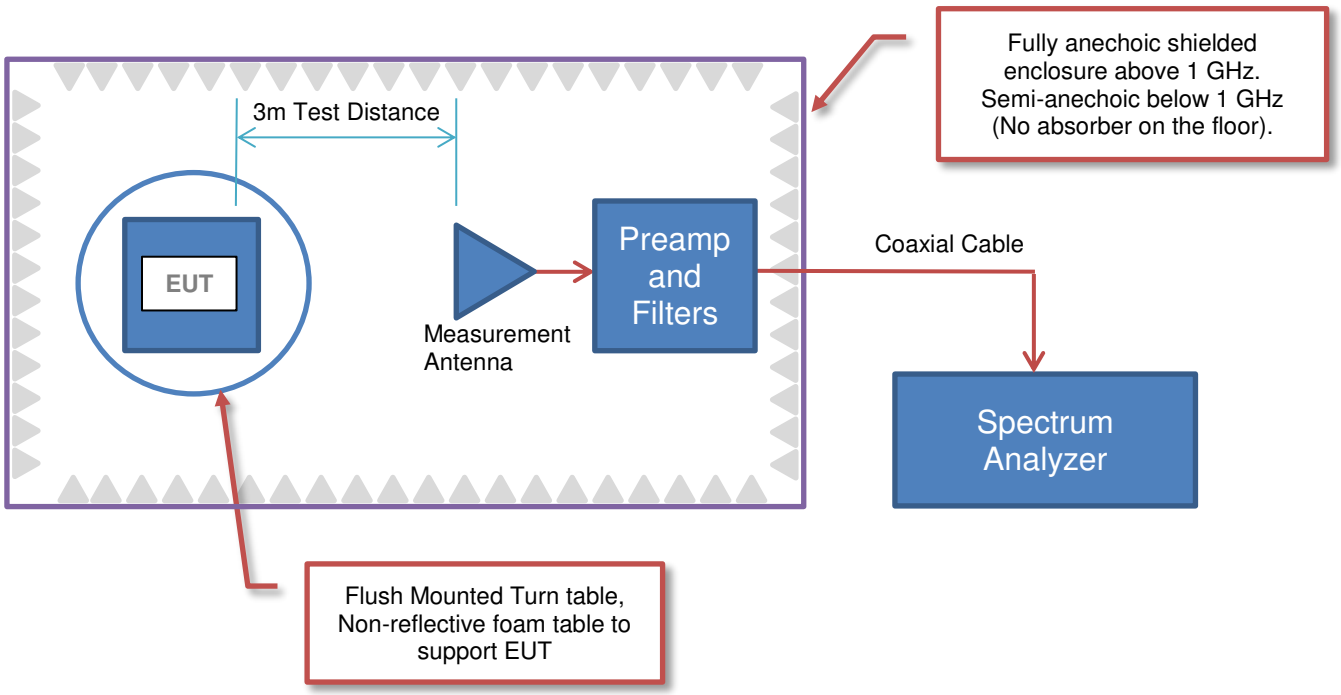
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Nytec Inc.
Address:	416 6th Street South
City, State, Zip:	Kirkland, WA 98033
Test Requested By:	Sam Richardson
Model:	XI Access Panel, Part Number: 40-10146
First Date of Test:	May 14, 2018
Last Date of Test:	May 18, 2018
Receipt Date of Samples:	May 14, 2018
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The Door Lock Panel is the visual, interactive interface for guests entering and leaving the ship staterooms. It identifies users, either guests or crew, wirelessly using the Medallion over BLE or NFC, communicating and controlling the lock mechanism via an ISM radio to provide access to the stateroom. Facial recognition can as well be used to grant access to the room. It also provides audio interaction capabilities between the hallway and cabin. The Door Lock Panel is mounted as a wall panel display and interfaces to the central control of the ship over a single ethernet connection which also powers the device. The panel can also work with battery power for several hours.

Testing Objective:
To demonstrate compliance of the 13.56 MHz NFC radio to FCC Part 15.225 requirements.

CONFIGURATIONS

Configuration NYTE0015- 2

Software/Firmware Running during test	
Description	**Version**
FccIsmTx.hex	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Panel	Nytec Inc.	xiAccess Pannel/40-10146	EV3-2

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
PoE Switch	Cisco	Catalyist 3560-CX	F0C1937Y4V4
Remote Laptop	Lenovo	P51S	980330557

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
8pin to RJ45	Yes	0.3 m	No	Access Panel	Cat6
Cat6	No	13 m	No	8pin to RJ45	PoE Switch
50 pin Flex Cable	No	0.1 m	No	Access Panel	Unterminated

Configuration NYTE0015- 3

Software/Firmware Running during test	
Description	**Version**
nfcfccclrc663.hex	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Panel	Nytec Inc.	xiAccess Pannel/40-10146	EV3-8

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RFID Card	Unknown	Grand Master	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
PoE Switch	Cisco	Catalyist 3560-CX	F0C1937Y4V4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Cat6	No	13 m	No	8pin to RJ45	PoE Switch

CONFIGURATIONS

Configuration NYTE0015- 4

Software/Firmware Running during test	
Description	**Version**
nfcfccclrc663.hex	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Panel	Nytec Inc.	xiAccess Pannel/40-10146	EV3-11

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Debug PCB	Nytec Inc.	20-10141 Rev. 2	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote Laptop	Lenovo	P51S	980330557

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
8pin to RJ45	Yes	0.3 m	No	Access Panel	Cat6
50 pin Flex Cable	No	0.1 m	No	Access Panel	Debug PCB
USB	Yes	1.8 m	No	Debug PCB	Remote Laptop
Cat6	No	0.9 m	No	8pin to RJ45	DC Power

CONFIGURATIONS

Configuration NYTE0015- 11

Software/Firmware Running during test	
Description	**Version**
FccIsmTx.hex	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Panel	Nytec Inc.	xiAccess Pannel/40-10146	EV3-3

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
PoE Injector	TP-Link	TP-POE150S	217729001099
I.T.E. Power Supply	TP-Link	TP480050-2B1	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
8pin to RJ45	Yes	0.3 m	No	Access Panel	Cat6
Cat5	No	1.5 m	No	PoE Injector	8pin to RJ45

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	5/14/2018	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	5/14/2018	Field Strength of Spurious Emissions Less Than 30 MHz	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	5/14/2018	Field Strength of Spurious Emissions Greater Than 30 MHz	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	5/15/2018	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	5/18/2018	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2017.11.22.1

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT.

The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10.

In the event that the operating frequency of 13.56 MHz is causing the product to fail the FCC 15.207 limits, the following guidance can be used:

In the FCC-TCBC Conference Call Meeting Minutes from April 12, 2005, the FCC stated:

> "We are willing to accept measurements on a 13.56 MHz transmitter done with a dummy load under the following conditions. First, perform the AC line conducted tests with the antenna attached to make sure the device complies with the 15.207 limits outside the transmitter's fundamental emission band, and then retest with a dummy load to make sure the device complies with the 15.207 limits inside the transmitter's fundamental emission band. For the second portion of these tests, only the fundamental emission band of the transmitter needs to be retested."

This procedure was followed for the AC powerline conducted emissions testing documented on the following pages.

Per the FCC Guidance, the FCC will accept measurements on a 13.56 MHz transmitter done with a dummy load under the following conditions. (1) First, perform the AC line conducted tests with the antenna attached to make sure the device complies with the 15.207 limits outside the transmitter's fundamental emission band, and then retest with a dummy load to make sure the device complies with the 15.207 limits inside the transmitter's fundamental emission band. (2) For the second portion of these tests, only the fundamental emission band of the transmitter needs to be retested.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARH	4/11/2018	4/11/2019
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKA	EVGA	4/4/2018	4/4/2019
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	10/4/2016	10/4/2018

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

NYTE0015-11

MODES INVESTIGATED

RFID 13.56 MHz, continuously polling RFID Tag

POWERLINE CONDUCTED EMISSIONS

element
WTD.2017.11.22.1

EUT:	XI Access Panel, Part Number: 40-10146	Work Order:	NYTE0015
Serial Number:	EV3-3	Date:	05/18/2018
Customer:	Nytec Inc.	Temperature:	22.8°C
Attendees:	Deven Bryant, Nuno Romao	Relative Humidity:	45.3%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	48 VDC POE via 110VAC/60Hz	Configuration:	NYTE0015-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

Run #:	11	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

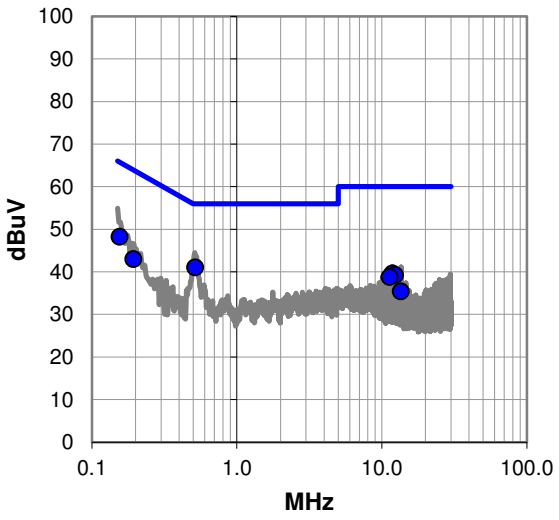
EUT OPERATING MODES

RFID 13.56 MHz, continuously polling RFID Tag

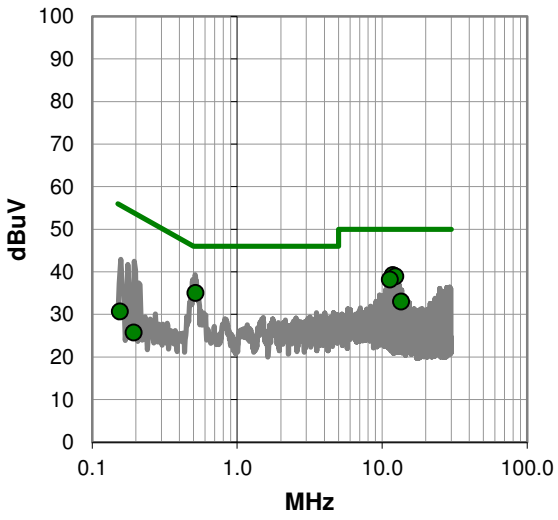
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2017.11.22.1

RESULTS - Run #11

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.515	21.8	19.2	41.0	56.0	-15.0
0.156	28.8	19.4	48.2	65.7	-17.5
11.856	19.7	19.9	39.6	60.0	-20.4
12.361	19.3	19.9	39.2	60.0	-20.8
0.193	23.7	19.3	43.0	63.9	-20.9
11.352	18.9	19.9	38.8	60.0	-21.2
13.561	15.5	19.9	35.4	60.0	-24.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
11.856	19.3	19.9	39.2	50.0	-10.8
0.515	15.8	19.2	35.0	46.0	-11.0
12.361	19.0	19.9	38.9	50.0	-11.1
11.352	18.3	19.9	38.2	50.0	-11.8
13.561	13.1	19.9	33.0	50.0	-17.0
0.156	11.3	19.4	30.7	55.7	-25.0
0.193	6.4	19.3	25.7	53.9	-28.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2017.11.22.1

EUT:	XI Access Panel, Part Number: 40-10146	Work Order:	NYTE0015
Serial Number:	EV3-3	Date:	05/18/2018
Customer:	Nytec Inc.	Temperature:	22.8°C
Attendees:	Deven Bryant, Nuno Romao	Relative Humidity:	45.3%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	48 VDC POE via 110VAC/60Hz	Configuration:	NYTE0015-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

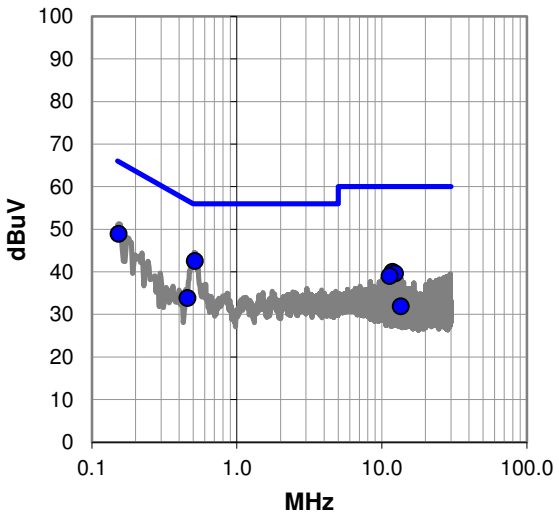
EUT OPERATING MODES

RFID 13.56 MHz, continuously polling RFID Tag

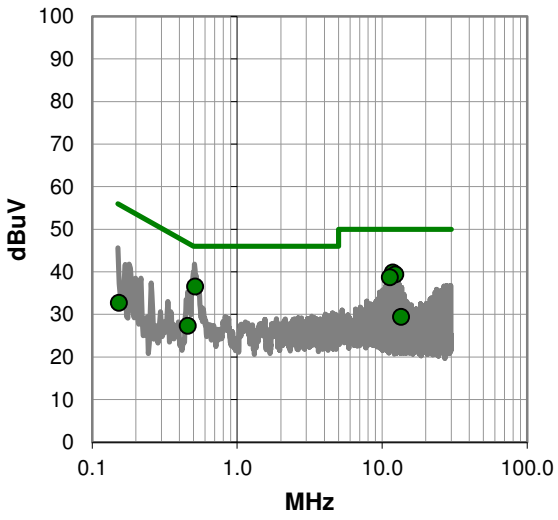
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2017.11.22.1

RESULTS - Run #12

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.515	23.3	19.2	42.5	56.0	-13.5
0.153	29.4	19.5	48.9	65.8	-16.9
11.858	20.1	19.9	40.0	60.0	-20.0
12.362	19.7	19.9	39.6	60.0	-20.4
11.352	19.1	19.9	39.0	60.0	-21.0
0.457	14.6	19.2	33.8	56.7	-22.9
13.558	12.0	19.9	31.9	60.0	-28.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.515	17.3	19.2	36.5	46.0	-9.5
11.858	19.9	19.9	39.8	50.0	-10.2
12.362	19.5	19.9	39.4	50.0	-10.6
11.352	18.8	19.9	38.7	50.0	-11.3
0.457	8.1	19.2	27.3	46.7	-19.4
13.558	9.5	19.9	29.4	50.0	-20.6
0.153	13.2	19.5	32.7	55.8	-23.1

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

PSA-ESCI 2017.12.19

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

RFID 13.56 MHz, Continuously Polling RFID tag.

POWER SETTINGS INVESTIGATED

48 VDC via POE

CONFIGURATIONS INVESTIGATED

NYTE0015 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	12 MHz	Stop Frequency	15 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-2018	12 mo
Cable	None	10m Test Distance Cable	EVL	28-Feb-2018	12 mo
Antenna - Loop	EMCO	6502	AOA	6-Jul-2016	24 mo

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

The fundamental carrier of the EUT was maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The center of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.4, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

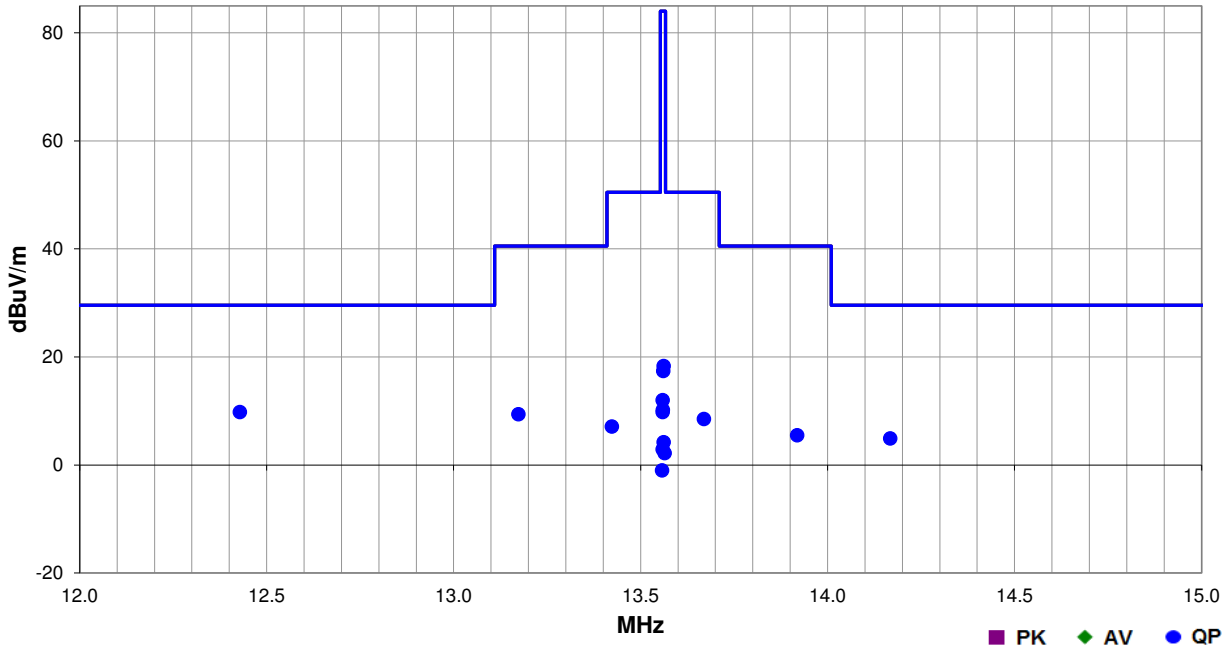
FIELD STRENGTH OF FUNDAMENTAL

EmiR5 2018.03.06.1 PSA-ESCI 2017.12.19

Work Order:	NYTE0015	**Date:**	14-May-2018		
Project:	None	**Temperature:**	23.2 °C		
Job Site:	EV11	**Humidity:**	48.8% RH		
Serial Number:	EV3-8	**Barometric Pres.:**	1015 mbar	**Tested by:**	Jeff Alcoke
EUT:	XI Access Panel, Part Number: 40-10146				
Configuration:	3				
Customer:	Nytec Inc.				
Attendees:	Deven Bryant				
EUT Power:	48 VDC via POE				
Operating Mode:	RFID 13.56 MHz, Continuously Polling RFID tag.				
Deviations:	None				
Comments:	See comments below for EUT orientation.				

Test Specifications	**Test Method**
FCC 15.225:2018	ANSI C63.10:2013

Run #	1	**Test Distance (m)**	10	**Antenna Height(s)**	1(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12.429	17.9	11.0	1.0	258.0	10.0	0.0	Perp EUT	QP	-19.1	9.8	29.5	-19.7	EUT On Side
14.167	13.0	11.0	1.0	258.0	10.0	0.0	Perp EUT	QP	-19.1	4.9	29.5	-24.6	EUT On Side
13.173	17.5	11.0	1.0	258.0	10.0	0.0	Perp EUT	QP	-19.1	9.4	40.5	-31.1	EUT On Side
13.919	13.6	11.0	1.0	258.0	10.0	0.0	Perp EUT	QP	-19.1	5.5	40.5	-35.0	EUT On Side
13.669	16.6	11.0	1.0	258.0	10.0	0.0	Perp EUT	QP	-19.1	8.5	50.5	-42.0	EUT On Side
13.423	15.2	11.0	1.0	258.0	10.0	0.0	Perp EUT	QP	-19.1	7.1	50.5	-43.4	EUT On Side
13.562	26.4	11.0	1.0	265.0	10.0	0.0	Perp EUT	QP	-19.1	18.3	84.0	-65.7	EUT On Side
13.560	25.5	11.0	1.0	246.0	10.0	0.0	Perp EUT	QP	-19.1	17.4	84.0	-66.6	EUT Vertical
13.559	20.1	11.0	1.0	146.0	10.0	0.0	Perp EUT	QP	-19.1	12.0	84.0	-72.0	EUT Horizontal
13.560	18.3	11.0	1.0	215.0	10.0	0.0	Par EUT	QP	-19.1	10.2	84.0	-73.8	EUT Vertical
13.559	17.9	11.0	1.0	196.0	10.0	0.0	Par EUT	QP	-19.1	9.8	84.0	-74.2	EUT On Side
13.561	12.3	11.0	1.0	266.0	10.0	0.0	Par GND	QP	-19.1	4.2	84.0	-79.8	EUT On Side
13.559	11.0	11.0	1.0	312.0	10.0	0.0	Par EUT	QP	-19.1	2.9	84.0	-81.1	EUT Horizontal
13.564	10.3	11.0	1.0	265.0	10.0	0.0	Par GND	QP	-19.1	2.2	84.0	-81.8	EUT Vertical
13.557	7.1	11.0	1.0	45.0	10.0	0.0	Par GND	QP	-19.1	-1.0	84.0	-85.0	EUT Horizontal

FIELD STRENGTH OF SPURIOUS EMISSIONS LESS THAN 30 MHZ

PSA-ESCI 2017.12.19

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

RFID 13.56 MHz, Continuously Polling RFID tag.

POWER SETTINGS INVESTIGATED

48 VDC via POE

CONFIGURATIONS INVESTIGATED

NYTE0015 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	30 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-2018	12 mo
Cable	None	10m Test Distance Cable	EVL	28-Feb-2018	12 mo
Antenna - Loop	EMCO	6502	AOA	6-Jul-2016	24 mo

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.4, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

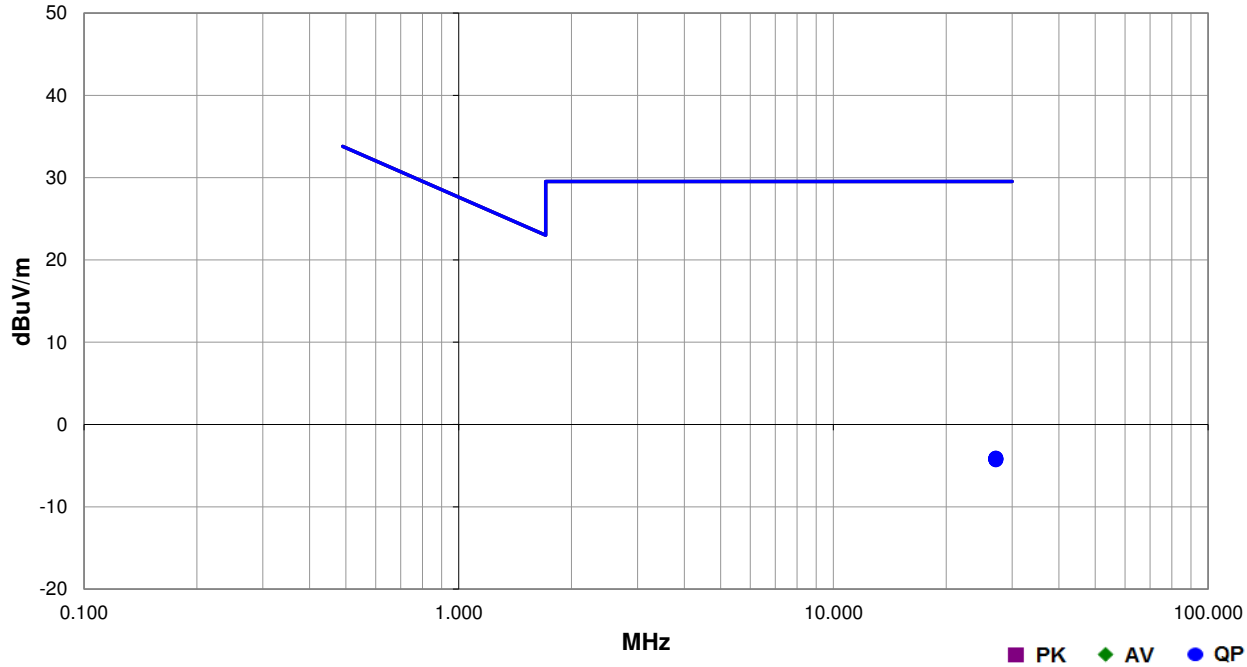
FIELD STRENGTH OF SPURIOUS EMISSIONS LESS THAN 30 MHZ

EmiR5 2018.03.06.1 PSA-ESCI 2017.12.19

Work Order:	NYTE0015	**Date:**	14-May-2018		
Project:	None	**Temperature:**	23.2 °C		
Job Site:	EV11	**Humidity:**	48.8% RH		
Serial Number:	EV3-8	**Barometric Pres.:**	1015 mbar	**Tested by:**	Jeff Alcoke
EUT:	XI Access Panel, Part Number: 40-10146				
Configuration:	3				
Customer:	Nytec Inc.				
Attendees:	Deven Bryant				
EUT Power:	48 VDC via POE				
Operating Mode:	RFID 13.56 MHz, Continuously Polling RFID tag.				
Deviations:	None				
Comments:	See comments below for EUT orientation.				

Test Specifications	**Test Method**
FCC 15.225:2018	ANSI C63.10:2013

Run #	1	**Test Distance (m)**	10	**Antenna Height(s)**	1(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
27.112	5.8	9.2	1.0	361.0	10.0	0.0	Perp EUT	QP	-19.1	-4.1	29.5	-33.6	EUT On Side
27.134	5.8	9.2	1.0	56.0	10.0	0.0	Par GND	QP	-19.1	-4.1	29.5	-33.6	EUT On Side
27.124	5.8	9.2	1.0	46.0	10.0	0.0	Par GND	QP	-19.1	-4.1	29.5	-33.6	EUT Vertical
27.129	5.7	9.2	1.0	-5.0	10.0	0.0	Par EUT	QP	-19.1	-4.2	29.5	-33.7	EUT Vertical
27.119	5.7	9.2	1.0	-5.0	10.0	0.0	Par EUT	QP	-19.1	-4.2	29.5	-33.7	EUT Horizontal
27.131	5.7	9.2	1.0	297.0	10.0	0.0	Par GND	QP	-19.1	-4.2	29.5	-33.7	EUT Horizontal
27.126	5.7	9.2	1.0	114.0	10.0	0.0	Perp EUT	QP	-19.1	-4.2	29.5	-33.7	EUT Vertical
27.110	5.6	9.2	1.0	215.0	10.0	0.0	Par EUT	QP	-19.1	-4.3	29.5	-33.8	EUT On Side
27.131	5.6	9.2	1.0	91.0	10.0	0.0	Perp EUT	QP	-19.1	-4.3	29.5	-33.8	EUT Horizontal

FIELD STRENGTH OF SPURIOUS EMISSIONS GREATER THAN 30 MHZ

PSA-ESCI 2017.12.19

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

RFID 13.56 MHz, Continuously Polling RFID tag.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

NYTE0015 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	140 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Filter - Low Pass	Micro-Tronics	LPM50004	HGR	28-Feb-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1551	AOY	28-Feb-2018	12 mo
Cable	None	10m Test Distance Cable	EVL	28-Feb-2018	12 mo
Antenna - Biconilog	EMCO	3141	AXG	17-Jul-2017	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-2018	12 mo

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

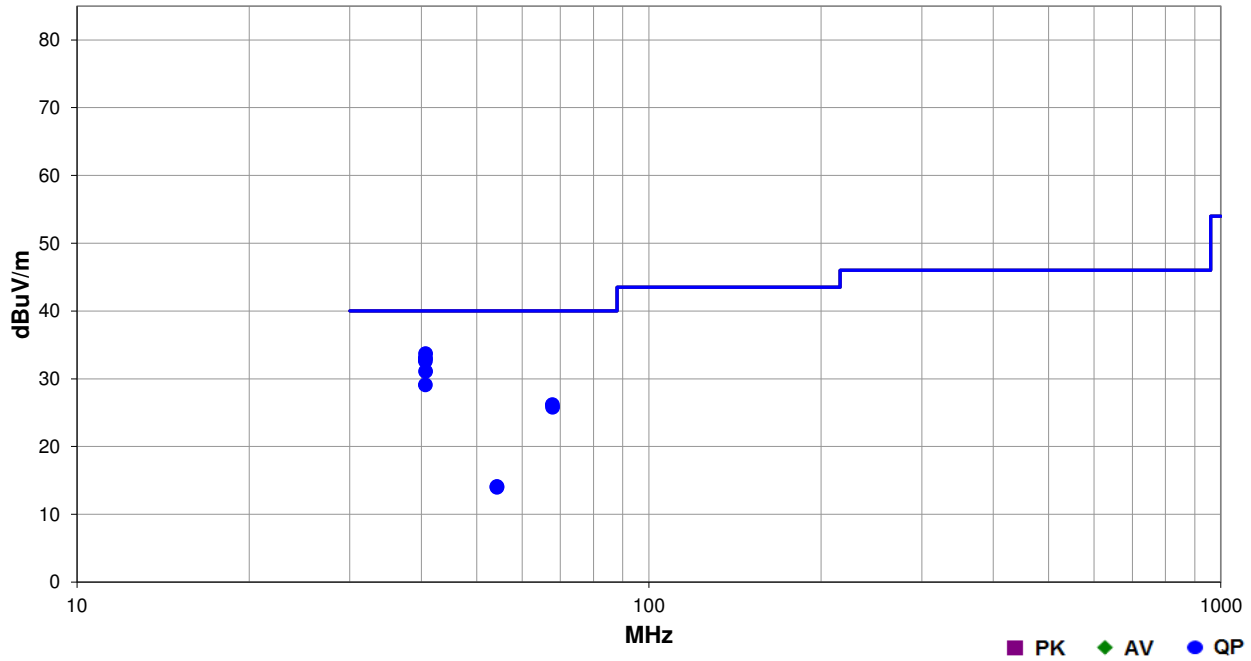
FIELD STRENGTH OF SPURIOUS EMISSIONS GREATER THAN 30 MHZ

EmiR5 2018.02.06 PSA-ESCI 2017.12.19

Work Order:	NYTE0015	**Date:**	14-May-2018		
Project:	None	**Temperature:**	23.1 °C		
Job Site:	EV11	**Humidity:**	48.3% RH		
Serial Number:	EV3-8	**Barometric Pres.:**	1017 mbar	**Tested by:**	Jeff Alcoke
EUT:	XI Access Panel, Part Number: 40-10146				
Configuration:	2				
Customer:	Nytec Inc.				
Attendees:	Deven Bryant, Nuno Romao				
EUT Power:	Battery				
Operating Mode:	RFID 13.56 MHz, Continuously Polling RFID tag.				
Deviations:	None				
Comments:	See comments below for EUT orientation				

Test Specifications	**Test Method**
FCC 15.225:2018	ANSI C63.10:2013

Run #	8	**Test Distance (m)**	10	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
40.673	49.6	-26.4	1.0	21.0	10.0	0.0	Vert	QP	10.5	33.7	40.0	-6.3	EUT on Side
40.661	48.9	-26.4	1.0	22.0	10.0	0.0	Horz	QP	10.5	33.0	40.0	-7.0	EUT on Side
40.665	48.9	-26.4	1.0	316.0	10.0	0.0	Vert	QP	10.5	33.0	40.0	-7.0	EUT Horizontal
40.655	48.5	-26.4	1.0	295.0	10.0	0.0	Horz	QP	10.5	32.6	40.0	-7.4	EUT Horizontal
40.689	47.0	-26.4	1.0	71.0	10.0	0.0	Vert	QP	10.5	31.1	40.0	-8.9	EUT Vertical
40.654	45.0	-26.4	1.0	95.0	10.0	0.0	Horz	QP	10.5	29.1	40.0	-10.9	EUT Vertical
67.799	46.8	-31.1	3.1	32.0	10.0	0.0	Vert	QP	10.5	26.2	40.0	-13.8	EUT on Side
67.822	46.4	-31.1	2.4	17.0	10.0	0.0	Horz	QP	10.5	25.8	40.0	-14.2	EUT on Side
54.231	33.7	-30.1	1.4	127.0	10.0	0.0	Vert	QP	10.5	14.1	40.0	-25.9	EUT on Side
54.231	33.6	-30.1	1.1	268.0	10.0	0.0	Horz	QP	10.5	14.0	40.0	-26.0	EUT on Side

FREQUENCY STABILITY

XMit 2017.12.13

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBI	NCR	NCR
Probe - Near Field Set	EMCO	7405	IPD	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	12-Jan-18	12-Jan-19
Thermometer	Omegaette	HH311	DTX	29-Mar-18	29-Mar-21
Meter - Multimeter	Tektronix	DMM912	MMH	17-Feb-16	17-Feb-19
Power Supply - DC	Hewlett-Packard	6654A	TPC	NCR	NCR

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made on the single transmit frequency as called out on the data sheets. Testing was done while the EUT was continuously polling.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage while at ambient temperature. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range of -20 ° to +50° C and at 10°C intervals.

The requirement of a frequency tolerance of ±0.01% is equivalent to 100 ppm
The formula to check for compliance is:

ppm = (Measured Frequency / Measured Nominal Frequency - 1) * 1,000,000

FREQUENCY STABILITY

TbtTx 2017.12.14 XMit 2017.12.13

EUT:	**XI Access Panel, Part Number: 40-10146**			**Work Order:**	**NYTE0015**
Serial Number:	**EV3-8**			**Date:**	**15-May-18**
Customer:	**Nytec Inc.**			**Temperature:**	**23.7 °C**
Attendees:	**Deven Bryant**			**Humidity:**	**47.2% RH**
Project:	**None**			**Barometric Pres.:**	**1017 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**48 VDC via POE**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.225:2018	ANSI C63.10:2013

COMMENTS

EUT On Side

DEVIATIONS FROM TEST STANDARD

None

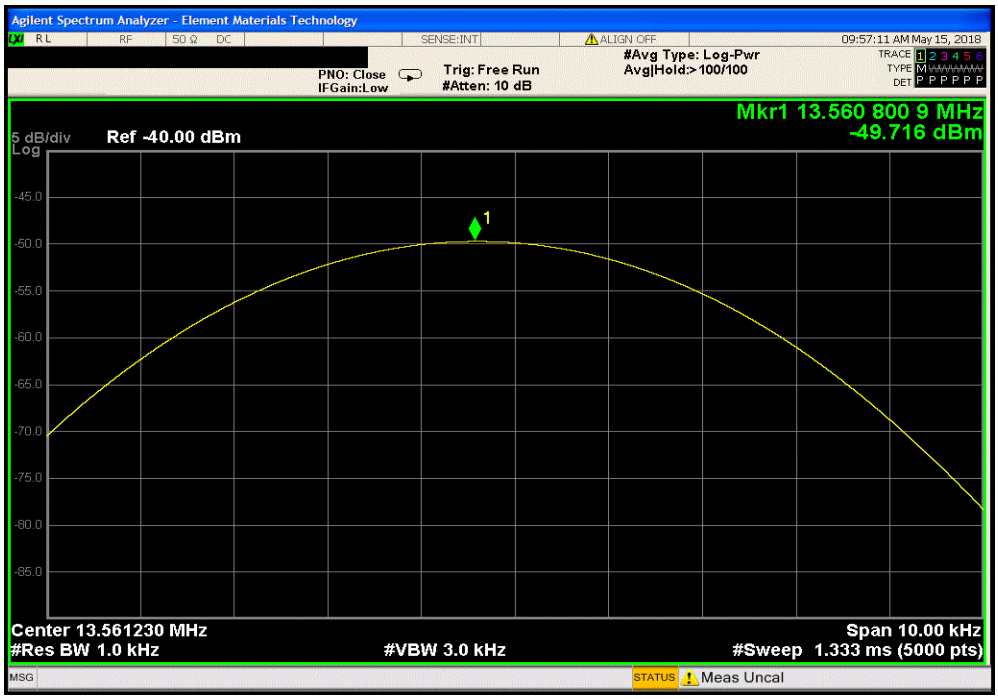
Configuration #	**4**	*Signature*

	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
13.56 MHz, CW					
55.2 VDC, 115% of Nominal, 20°C	13.5608009	13.56	59.1	100	Pass
48.0 VDC, 100% of Nominal, 20°C	13.5607989	13.56	58.9	100	Pass
40.8 VDC, 85% of Nominal, 20°C	13.5608009	13.56	59.1	100	Pass
48.0 VDC, 50°C	13.5608309	13.56	61.3	100	Pass
48.0 VDC, 40°C	13.5608169	13.56	60.2	100	Pass
48.0 VDC, 30°C	13.5608169	13.56	60.2	100	Pass
48.0 VDC, 10°C	13.5608029	13.56	59.2	100	Pass
48.0 VDC, 0°C	13.5608189	13.56	60.4	100	Pass
48.0 VDC, -10°C	13.5608389	13.56	61.9	100	Pass
48.0 VDC, -20°C	13.5608309	13.56	61.3	100	Pass

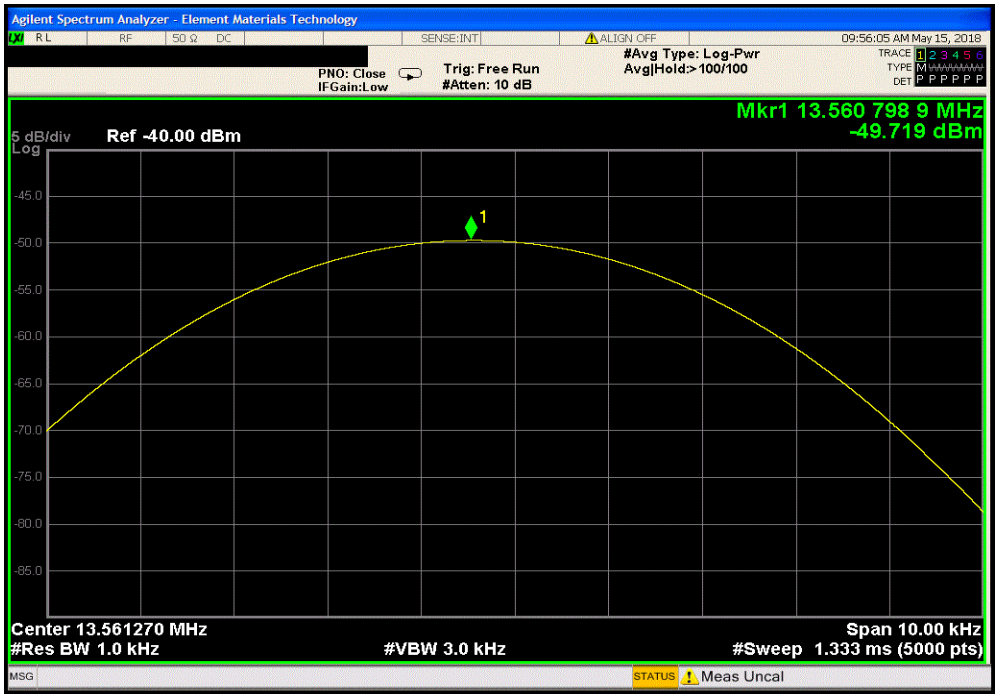
FREQUENCY STABILITY

TbtTx 2017.12.14 XMit 2017.12.13

13.56 MHz, CW, 55.2 VDC, 115% of Nominal, 20°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56080091	13.56	59.1	100	Pass



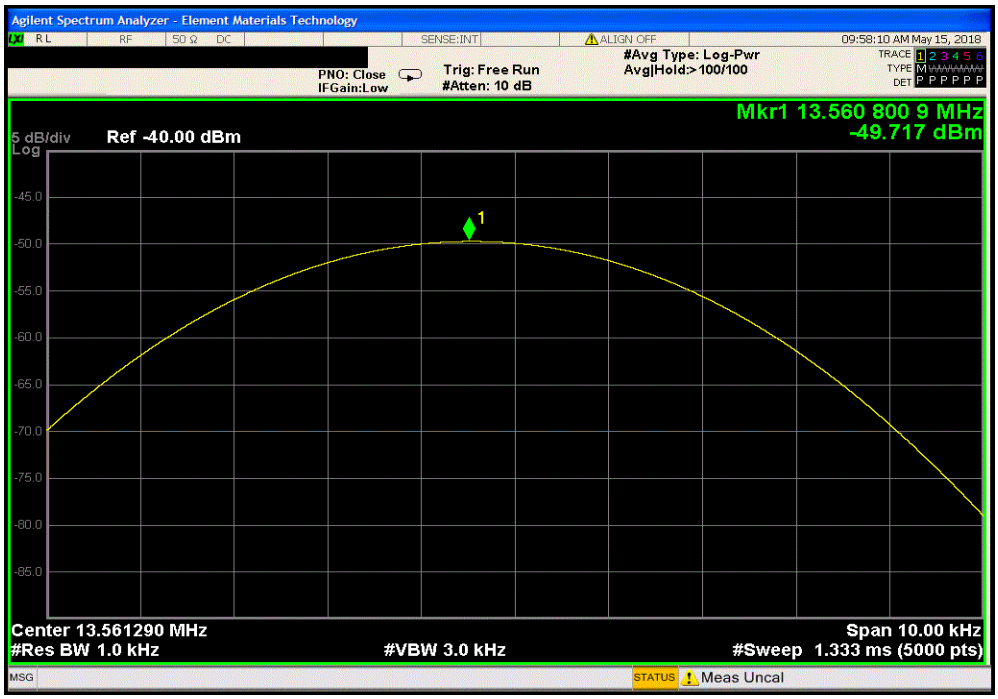
13.56 MHz, CW, 48.0 VDC, 100% of Nominal, 20°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56079891	13.56	58.9	100	Pass



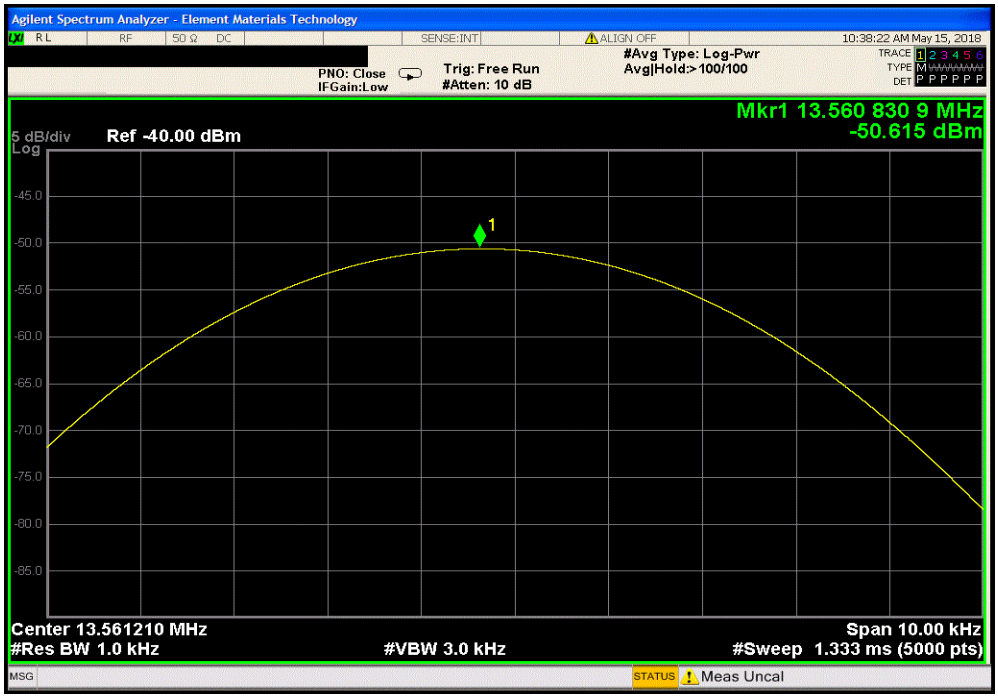
FREQUENCY STABILITY

TbtTx 2017.12.14 XMit 2017.12.13

13.56 MHz, CW, 40.8 VDC, 85% of Nominal, 20°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.5608009	13.56	59.1	100	Pass



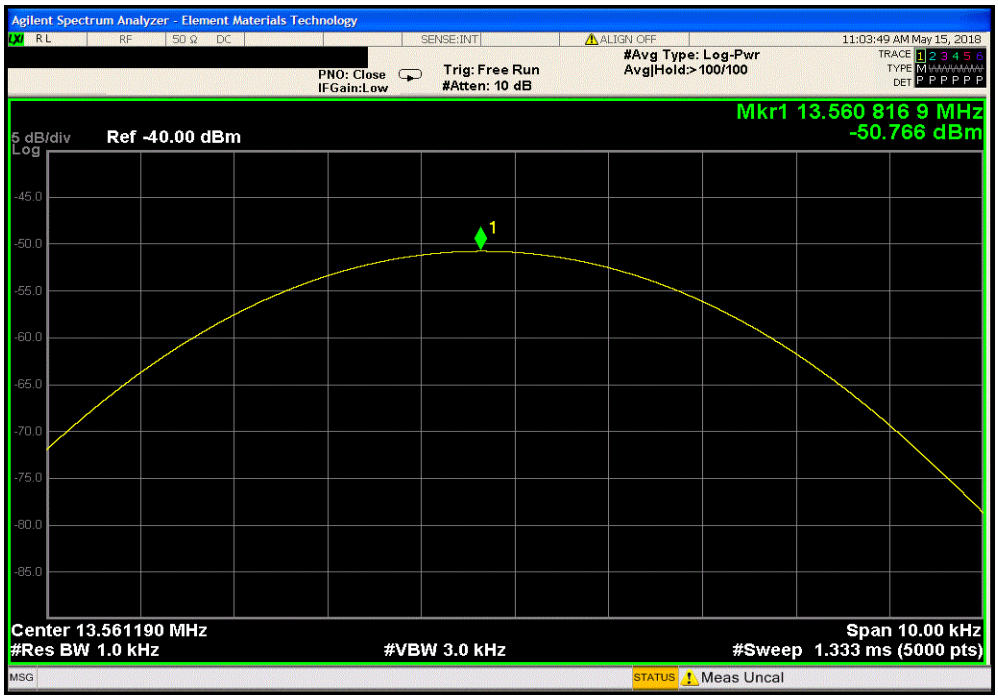
13.56 MHz, CW, 48.0 VDC, 50°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56083092	13.56	61.3	100	Pass



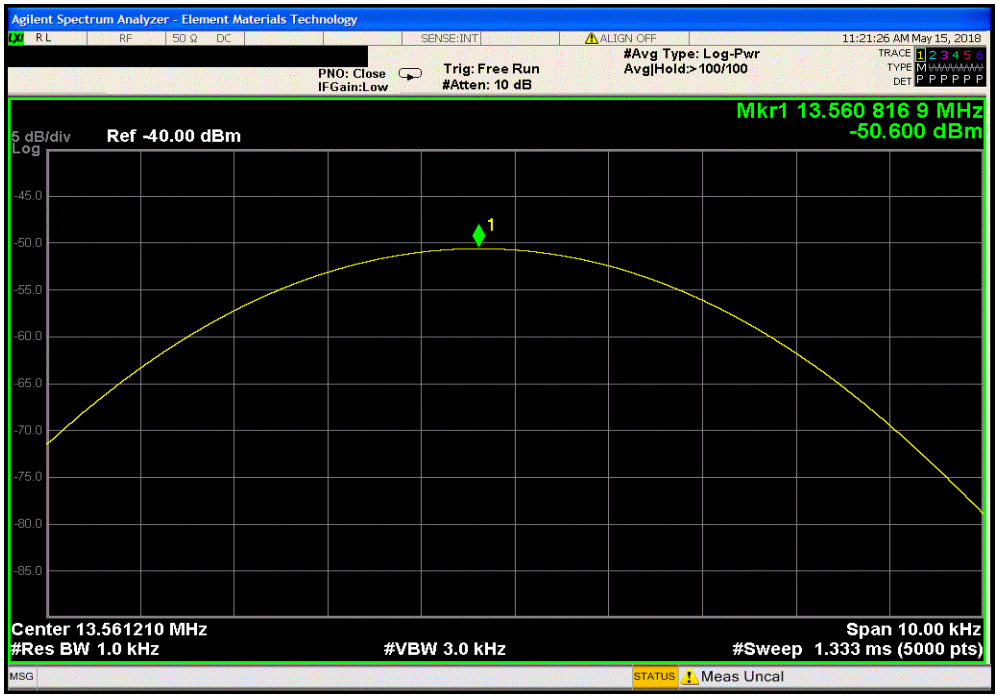
FREQUENCY STABILITY

TbtTx 2017.12.14 XMit 2017.12.13

13.56 MHz, CW, 48.0 VDC, 40°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56081693	13.56	60.2	100	Pass



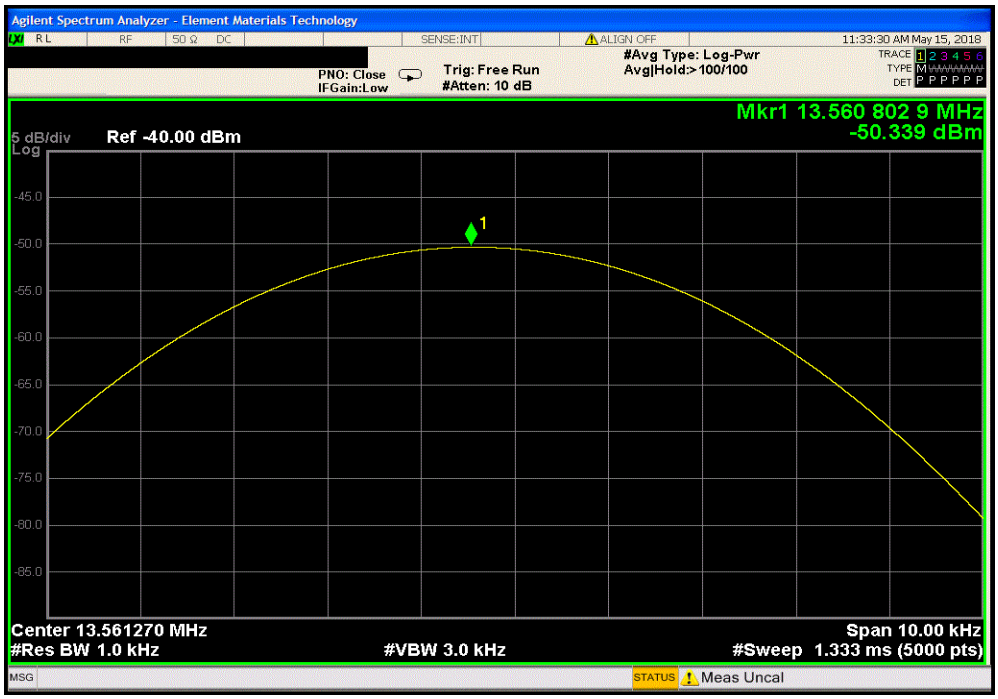
13.56 MHz, CW, 48.0 VDC, 30°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56081692	13.56	60.2	100	Pass



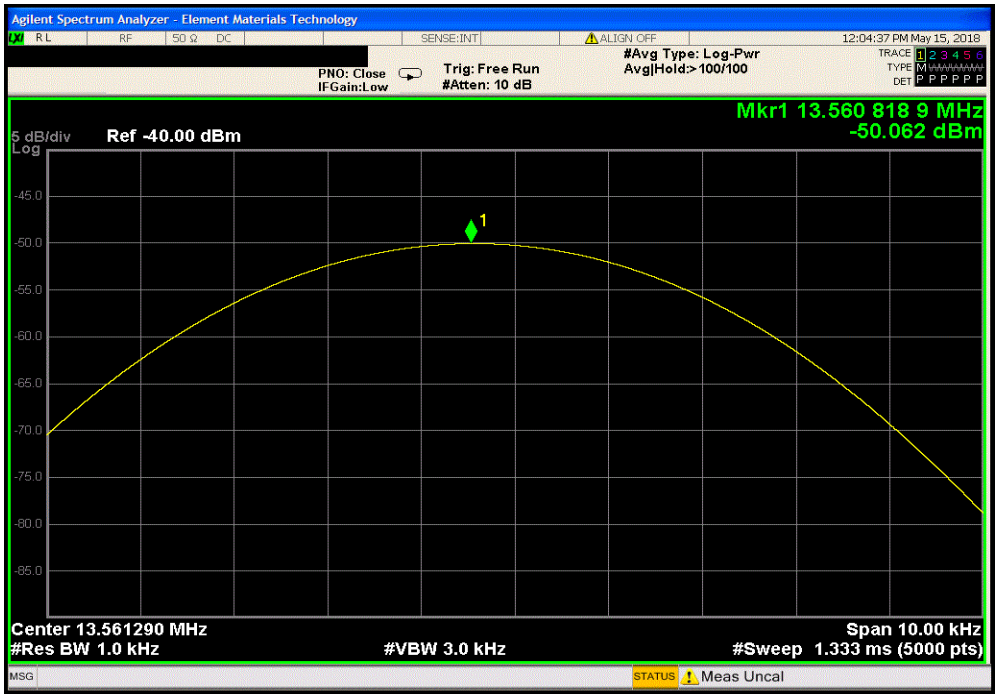
FREQUENCY STABILITY

TbtTx 2017.12.14 XMit 2017.12.13

13.56 MHz, CW, 48.0 VDC, 10°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56080291	13.56	59.2	100	Pass



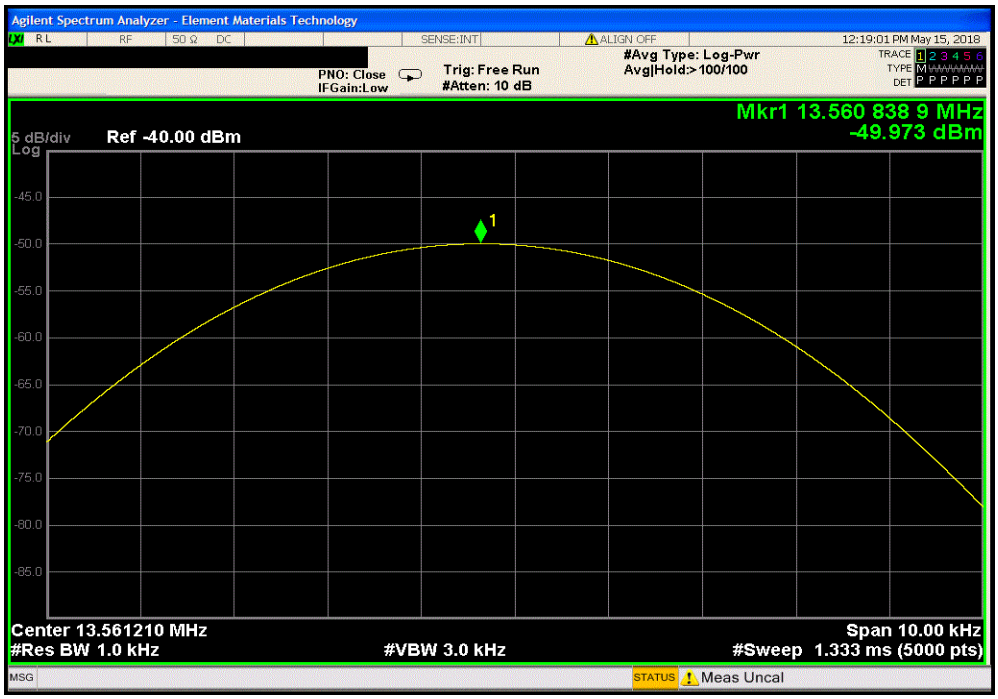
13.56 MHz, CW, 48.0 VDC, 0°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56081891	13.56	60.4	100	Pass



FREQUENCY STABILITY

TbtTx 2017.12.14 XMit 2017.12.13

13.56 MHz, CW, 48.0 VDC, -10°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56083893	13.56	61.9	100	Pass



13.56 MHz, CW, 48.0 VDC, -20°C						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56083091	13.56	61.3	100	Pass