



FCC RADIO TEST REPORT

FCC ID : UZ7FX7500
Equipment : FX7500 RFID FIXED READER
Brand Name : Zebra
Model Name : FX7500
Applicant : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Manufacturer : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Standard : 47 CFR FCC Part 15.247

The product was received on Aug. 30, 2018, and testing was started from Sep. 04, 2018 and completed on Sep. 14, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Photographs of EUT v01



TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB Ver1.0



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(a)	20dB Bandwidth	PASS	-
3.2	15.247(a)	Carrier Frequency Separation	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(a)	Number of Hopping Frequencies	PASS	-
3.5	15.247(a)	Time of Occupancy (Dwell Time)	PASS	-
3.6	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.7	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Reviewed by: Sam Chen

Report Producer: Wendy Pan



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Modulation	Ch. Frequency (MHz)	Channel Number
902-928MHz	DB-ASK, PR-ASK	903.1~ 926.95 MHz	1-50 [50]

Band	Mode	BWch (MHz)	Nant
902-928MHz	RFID	0.5	1TX

Note:

- ♦ BWch is the nominal channel bandwidth.
- ♦ Nss-Min is the minimum number of spatial streams.
- ♦ Nant is the number of outputs. e.g., 2(2, 3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Laird	PAL902010-ZB1	Circularly Polarized Plate	Fixed Type -N Female	6.6

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) $\geq 1/T$
RFID_Nss1_1TX	1	0	50.006m	10

1.1.4 EUT Operational Condition

EUT Power Type	From power adapter or PoE
Test Software Version	PUTTY.EXE(R0.62)

1.1.5 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR660830

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Modifying the EUT channel space to 450kHz.	All test items.

1.1.6 Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
902 ~ 928 MHz	1	903.1	26	914.35
	2	903.55	27	914.8
	3	904	28	915.25
	4	904.45	29	915.7
	5	904.9	30	916.15
	6	905.35	31	916.6
	7	905.8	32	917.05
	8	906.25	33	917.5
	9	906.7	34	917.95
	10	907.15	35	918.4
	11	907.6	36	918.85
	12	908.05	37	919.3
	13	908.5	38	919.75
	14	908.95	39	920.2
	15	909.4	40	920.65
	16	909.85	41	921.1
	17	910.3	42	921.55
	18	910.75	43	922
	19	911.2	44	922.45
	20	911.65	45	922.9
	21	912.1	46	923.35
	22	912.55	47	924.25
	23	913	48	924.7
	24	913.45	49	925.6
	25	913.9	50	926.95



1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ FCC Public Notice DA 00-705

1.3 Testing Location Information

Testing Location				
☐	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	TEL : 886-3-327-3456	FAX : 886-3-327-0973
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.	TEL : 886-3-656-9065	FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Justin Lin	25°C / 60%	Sep. 05, 2018 ~ Sep. 13, 2018
Radiated	03CH01-CB	Robert Jiang	25°C / 54%	Sep. 04, 2018
AC Conduction	CO02-CB	GN	23°C / 61%	Sep. 14, 2018

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Bandwidth Measurement	9.74×10^{-8}	Confidence levels of 95%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
RFID_Nss1_1TX	-
903.1MHz	310
913.9MHz	306
926.95MHz	296

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral
Operating Mode	CTX
1	EUT with PoE
2	EUT with Adapter
For operating mode 2 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	20dB Bandwidth Carrier Frequency Separation Maximum Conducted Output Power Number of Hopping Frequencies Hopping Bandedge Time of Occupancy (Dwell Time) Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	CTX
1	EUT Z axis with PoE
2	EUT Z axis with Adapter
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
1	EUT Z axis with Adapter

Note: 1. There are 4 antenna ports for this EUT. After evaluating, antenna port 1 was the worst case. Thus, antenna port 1 was used to test.

2. The test configuration and test modes written in this test report are designated by the applicant.

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



2.4 Accessories

Accessories				
Equipment Name	Brand Name	Model Name	Rating	Remark
Adapter	LEADER ELECTRONICS INC.	NU80-4240325-I1	Input: 100-240V~50/60Hz 1.4A Output: 24.0V, 3.25A	DC cable Non-shielded, 2.0m
Equipment Name	Brand Name	Model Name	Rating	
PoE	Symbol	AP-PSBIAS-2P3-ATR	Input: 100-240VAC~50/60Hz, 0.67A Output: 55V, 0.6A	
Others				
Power line*1: Non-shielded, 1.8m Ant. cable*4: Shielded, 5.2m				

2.5 Support Equipment

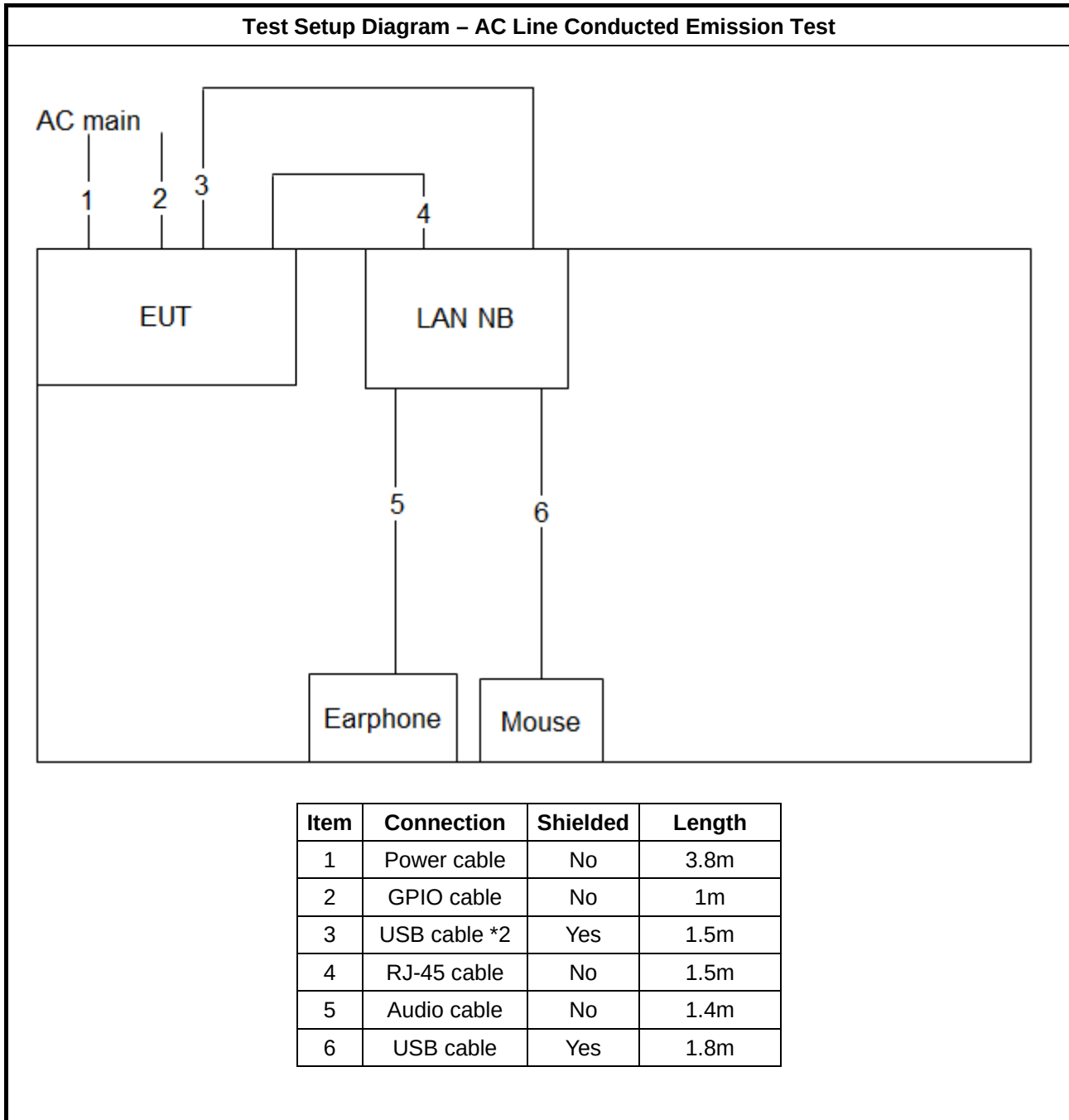
For Test Site No: CO02-CB

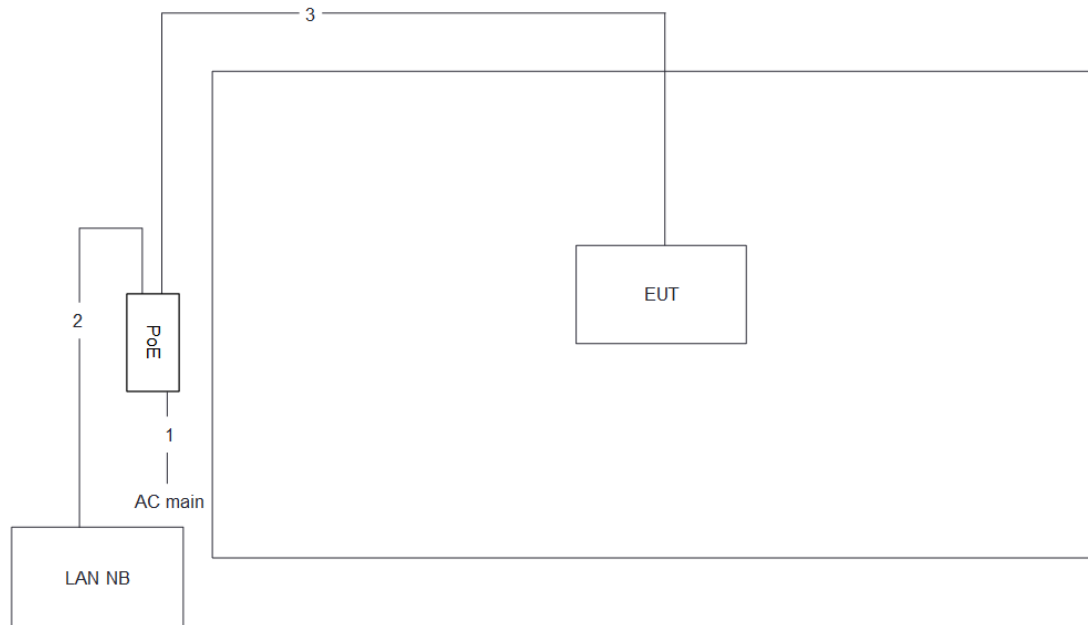
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Earphone	e-Power	S90W	N/A
2	Mouse	HP	FM100	N/A
3	NB	DELL	E6430	N/A

For Test Site No: 03CH01-CB and TH01-CB

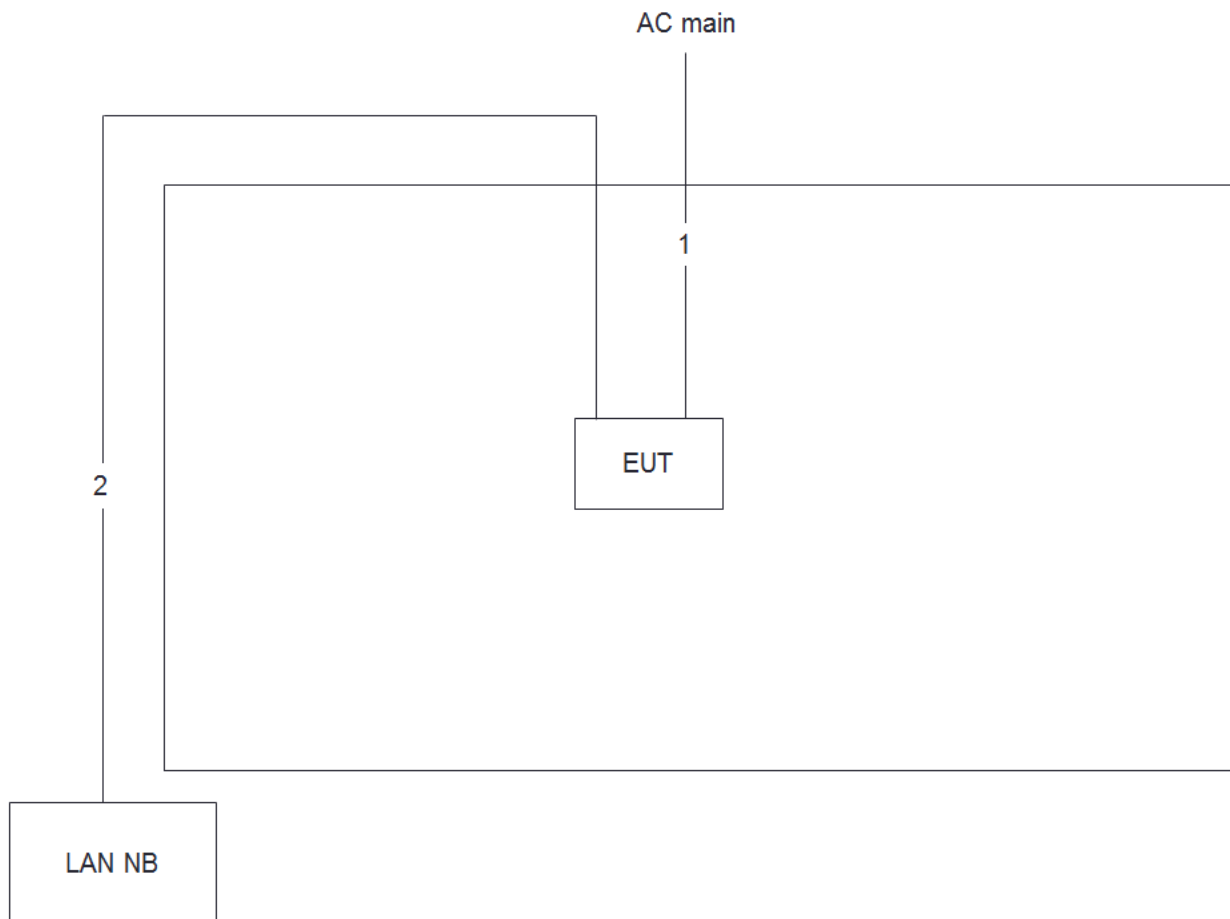
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E4300	N/A

2.6 Test Setup Diagram



Test Setup Diagram - Radiated Test < 1GHz


Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test > 1GHz


Item	Connection	Shielded	Length
1	Power cable	No	3.8m
2	RJ-45 cable	No	10m



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

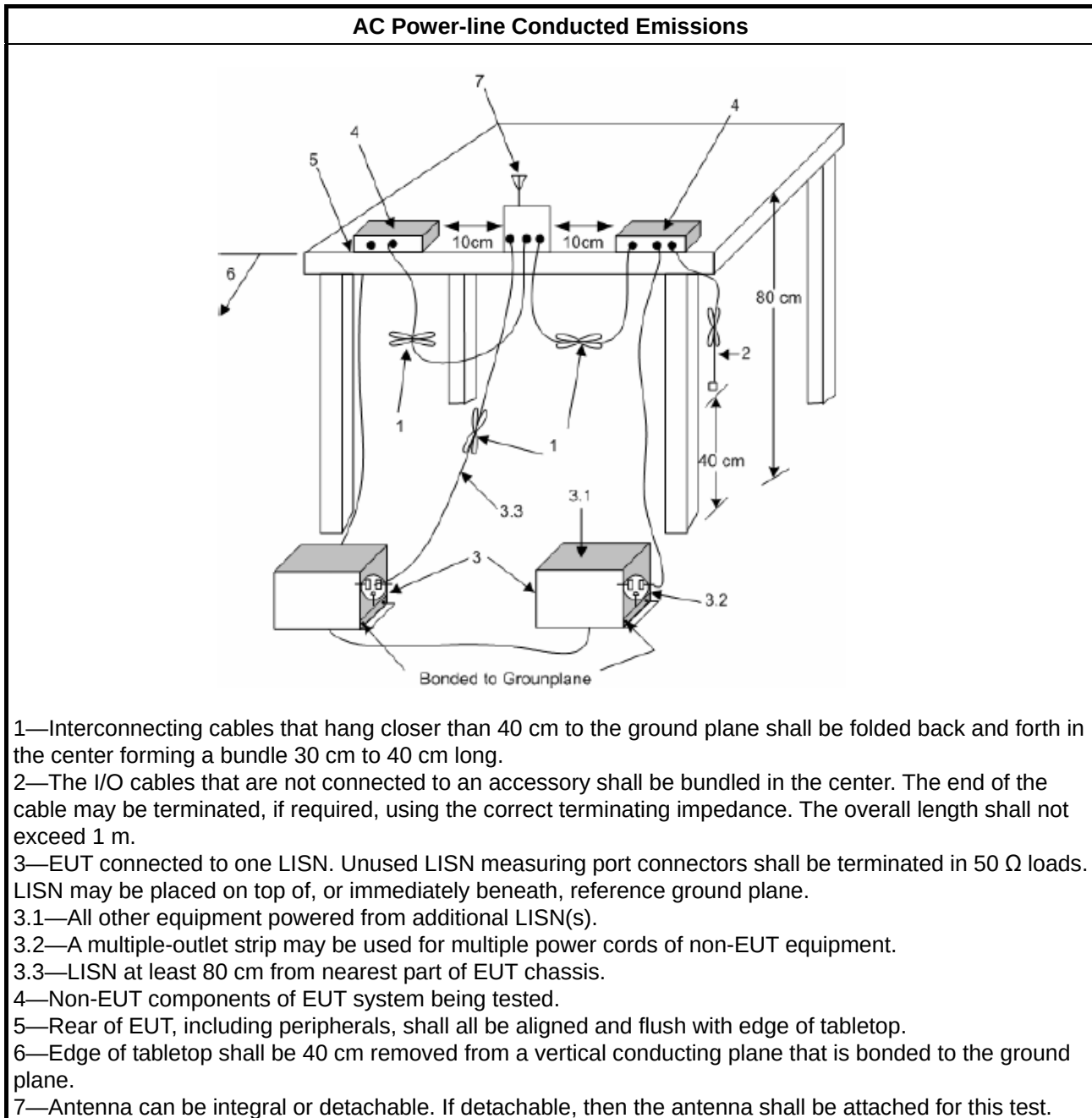
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 20dB Bandwidth and Carrier Frequency Separation

3.2.1 20dB Bandwidth and Carrier Frequency Separation Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $\leq$ 250 kHz.
	▪ $50 > N \geq 25$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $>$ 250 kHz.
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz).
	▪ $75 > N \geq 15$ and $ChS \geq \text{MAX}$ (20 dB bandwidth 2/3, 25 kHz).
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $\leq$ 1 MHz.
N: Number of Hopping Frequencies; ChS: Hopping Channel Separation	

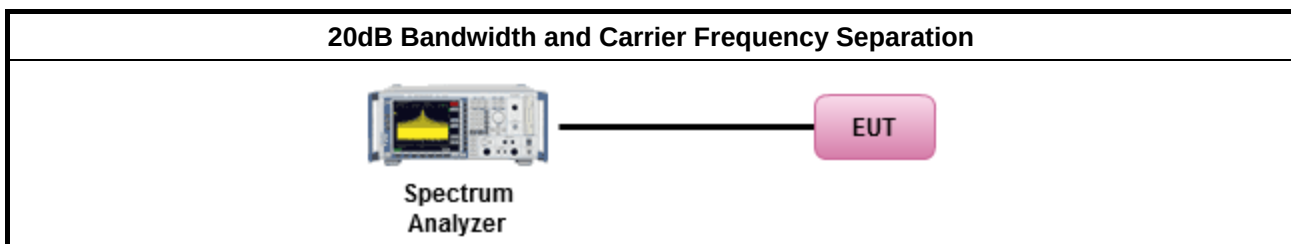
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.9.1 for 20 dB bandwidth measurement.
▪ Refer as ANSI C63.10-2013, clause 7.8.2 for carrier frequency separation measurement.

3.2.4 Test Setup



3.2.5 Test Result of 20dB Bandwidth

Refer as Appendix B

3.2.6 Test Result of Carrier Frequency Separation

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$; Power 30dBm; EIRP 36dBm
	▪ $50 > N \geq 25$; Power 24dBm; EIRP 30dBm
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$; Power 30dBm; EIRP 36dBm
	▪ $75 > N \geq 15$; Power 21dBm; EIRP 27dBm
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$; Power 30dBm; EIRP 36dBm
N: Number of Hopping Frequencies	

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 7.8.5 for output power measurement.

3.3.4 Test Setup

Maximum Conducted Output Power (Peak Power Meter)
 The diagram illustrates the test setup for measuring Maximum Conducted Output Power. It shows a Power Meter (a blue and white device with a screen and buttons) connected via a cable to an EUT (Equipment Under Test, represented by a pink box). The Power Meter is also connected to a computer (represented by a monitor and tower unit) for data logging.

3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Number of Hopping Frequencies

3.4.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth ≤ 250 kHz.
	▪ $50 > N \geq 25$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth > 250 kHz.
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz).
	▪ $75 > N \geq 15$ and $ChS \geq MAX$ (20 dB bandwidth 2/3, 25 kHz).
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth ≤ 1 MHz.
N: Number of Hopping Frequencies; ChS : Hopping Channel Separation	

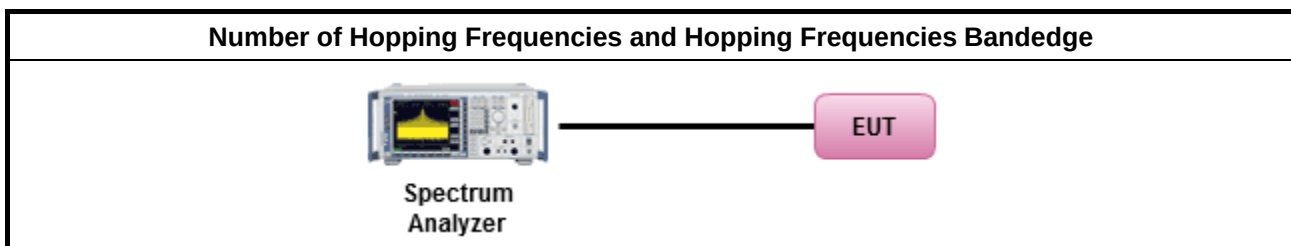
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 7.8.3 for number of hopping frequencies measurement.

3.4.4 Test Setup



3.4.5 Test Result of Number of Hopping Frequencies

Refer as Appendix D

3.5 Time of Occupancy (Dwell Time)

3.5.1 Time of Occupancy (Dwell Time) Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$; 0.4s in 20s period
	▪ $50 > N \geq 25$; 0.4s in 10s period
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$; 0.4s in $N \times 0.4$ period
	▪ $75 > N \geq 15$; 0.4s in $N \times 0.4$ period
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$; 0.4s in 30s period
N: Number of Hopping Frequencies	

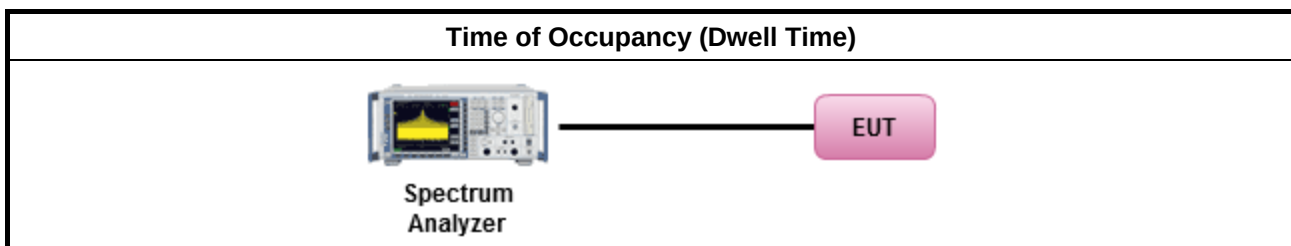
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
▪ Refer as ANSI C63.10-2013, clause 7.8.4 for dwell time measurement.	
▪ Bluetooth ACL packets can be 1, 3, or 5 time slots. Following as dwell time. Operate DH5 at maximum dwell time and maximum duty cycle.	
	▪ The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is $5/1600$ seconds, or 3.125ms. DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel.

3.5.4 Test Setup



3.5.5 Test Result of Time of Occupancy (Dwell Time)

Refer as Appendix E

3.6 Emissions in Non-restricted Frequency Bands

3.6.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.	

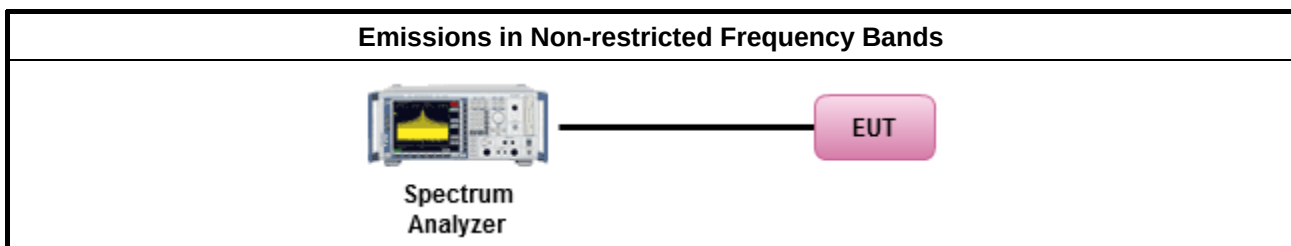
3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 7.8.8 for unwanted emissions into non-restricted bands.

3.6.4 Test Setup



3.6.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix F

3.7 Emissions in Restricted Frequency Bands

3.7.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

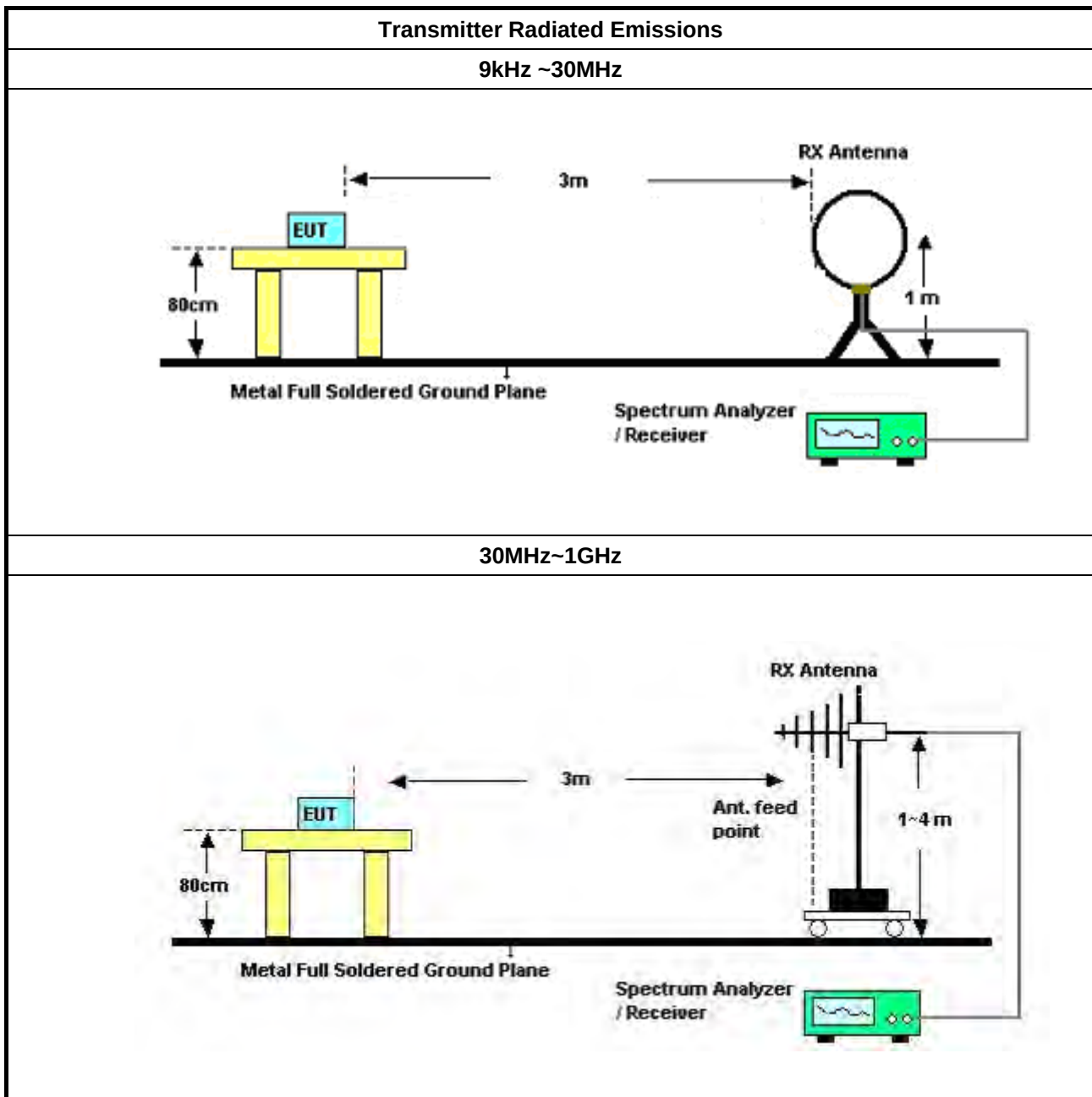
3.7.2 Measuring Instruments

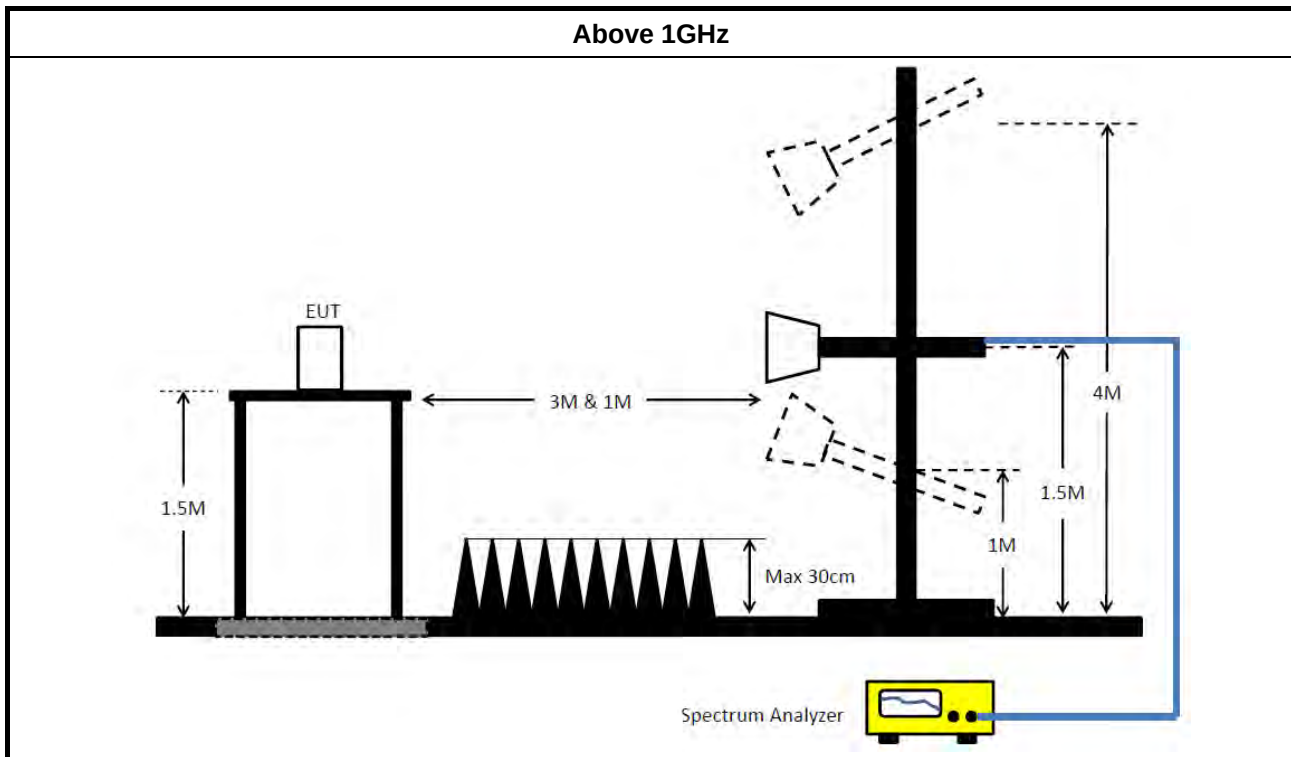
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method	
▪ The average emission levels shall be measured in [hopping duty factor].	
▪ Refer as ANSI C63.10; clause 6.9.2.2 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
▪ For the transmitter unwanted emissions shall be measured using following options below:	
	▪ Refer as ANSI C63.10, clause 4.1.4.2.1 QP value.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.

3.7.4 Test Setup





3.7.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.7.6 Transmitter Radiated Unwanted Emissions

Refer as Appendix G



4 Test Equipment and Calibration Data

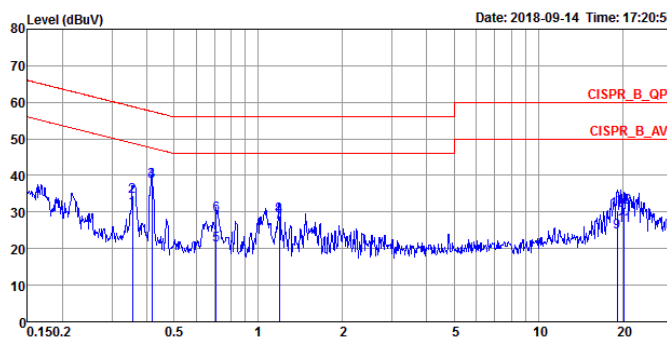
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 24, 2017	Nov. 23, 2018	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 13, 2017	Nov. 12, 2018	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 17, 2018	Jan. 16, 2019	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Nov. 10, 2017	Nov. 09, 2018	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 27, 2018	Aug. 26, 2019	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2018	Mar. 15, 2019	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 28, 2018	Jun. 27, 2019	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2018	May 01, 2019	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 04, 2018	Jul. 03, 2019	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100354	9kHz ~ 2.75GHz	Dec. 08, 2017	Dec. 07, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 21, 2017	Dec. 20, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 20, 2017	Nov. 19, 2018	Conducted (TH01-CB)

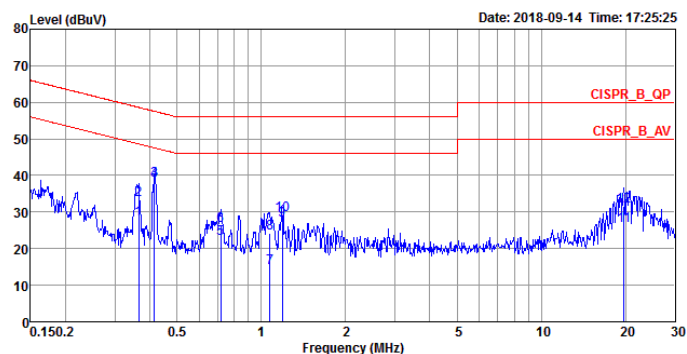
Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.

AC Power-line Conducted Emissions Result																																																																																																																																																					
Operating Mode		2		Power Phase		Neutral																																																																																																																																															
Operating Function		CTX																																																																																																																																																			
Level (dBuV)  Date: 2018-09-14 Time: 17:20:56 <table><tr><th></th><th>Freq</th><th>Level</th><th>Over Limit</th><th>Limit Line</th><th>Read Level</th><th>LISN Factor</th><th>Cable Loss</th><th>Remark</th><th>Pol/Phase</th></tr><tr><th></th><th>MHz</th><th>dBuV</th><th>dB</th><th>dBuV</th><th>dBuV</th><th>dB</th><th>dB</th><th></th><th></th></tr><tr><td>1</td><td>0.3558</td><td>30.79</td><td>-18.04</td><td>48.83</td><td>20.59</td><td>10.17</td><td>0.03</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>2</td><td>0.3558</td><td>34.12</td><td>-24.71</td><td>58.83</td><td>23.92</td><td>10.17</td><td>0.03</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>3</td><td>0.4171</td><td>38.48</td><td>-9.03</td><td>47.51</td><td>28.28</td><td>10.17</td><td>0.03</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>4</td><td>0.4171</td><td>38.30</td><td>-19.21</td><td>57.51</td><td>28.10</td><td>10.17</td><td>0.03</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>5</td><td>0.7084</td><td>20.85</td><td>-25.15</td><td>46.00</td><td>10.65</td><td>10.18</td><td>0.02</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>6</td><td>0.7084</td><td>29.26</td><td>-26.74</td><td>56.00</td><td>19.06</td><td>10.18</td><td>0.02</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>7</td><td>1.1907</td><td>27.26</td><td>-18.74</td><td>46.00</td><td>17.05</td><td>10.18</td><td>0.03</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>8</td><td>1.1907</td><td>28.89</td><td>-27.11</td><td>56.00</td><td>18.68</td><td>10.18</td><td>0.03</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>9</td><td>19.1220</td><td>24.56</td><td>-25.44</td><td>50.00</td><td>14.05</td><td>10.39</td><td>0.12</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>10</td><td>19.1220</td><td>30.40</td><td>-29.60</td><td>60.00</td><td>19.89</td><td>10.39</td><td>0.12</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>11</td><td>20.2696</td><td>26.22</td><td>-23.78</td><td>50.00</td><td>15.70</td><td>10.40</td><td>0.12</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>12</td><td>20.2696</td><td>31.33</td><td>-28.67</td><td>60.00</td><td>20.81</td><td>10.40</td><td>0.12</td><td>QP</td><td>NEUTRAL</td></tr></table>											Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase		MHz	dBuV	dB	dBuV	dBuV	dB	dB			1	0.3558	30.79	-18.04	48.83	20.59	10.17	0.03	Average	NEUTRAL	2	0.3558	34.12	-24.71	58.83	23.92	10.17	0.03	QP	NEUTRAL	3	0.4171	38.48	-9.03	47.51	28.28	10.17	0.03	Average	NEUTRAL	4	0.4171	38.30	-19.21	57.51	28.10	10.17	0.03	QP	NEUTRAL	5	0.7084	20.85	-25.15	46.00	10.65	10.18	0.02	Average	NEUTRAL	6	0.7084	29.26	-26.74	56.00	19.06	10.18	0.02	QP	NEUTRAL	7	1.1907	27.26	-18.74	46.00	17.05	10.18	0.03	Average	NEUTRAL	8	1.1907	28.89	-27.11	56.00	18.68	10.18	0.03	QP	NEUTRAL	9	19.1220	24.56	-25.44	50.00	14.05	10.39	0.12	Average	NEUTRAL	10	19.1220	30.40	-29.60	60.00	19.89	10.39	0.12	QP	NEUTRAL	11	20.2696	26.22	-23.78	50.00	15.70	10.40	0.12	Average	NEUTRAL	12	20.2696	31.33	-28.67	60.00	20.81	10.40	0.12	QP	NEUTRAL
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase																																																																																																																																												
	MHz	dBuV	dB	dBuV	dBuV	dB	dB																																																																																																																																														
1	0.3558	30.79	-18.04	48.83	20.59	10.17	0.03	Average	NEUTRAL																																																																																																																																												
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10	19.1220	30.40	-29.60	60.00	19.89	10.39	0.12	QP	NEUTRAL																																																																																																																																												
11	20.2696	26.22	-23.78	50.00	15.70	10.40	0.12	Average	NEUTRAL																																																																																																																																												
12	20.2696	31.33	-28.67	60.00	20.81	10.40	0.12	QP	NEUTRAL																																																																																																																																												
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)																																																																																																																																																					

AC Power-line Conducted Emissions Result

Operating Mode	2	Power Phase	Line
Operating Function	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable		
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark	Pol/Phase
			dB	dBuV	dBuV	dB	dB		
1	0.3653	28.17	-20.44	48.61	17.98	10.16	0.03	Average	LINE
2	0.3653	33.40	-25.21	58.61	23.21	10.16	0.03	QP	LINE
3	0.4148	38.64	-8.91	47.55	28.45	10.16	0.03	Average	LINE
4	0.4148	38.67	-18.88	57.55	28.48	10.16	0.03	QP	LINE
5	0.7160	22.77	-23.23	46.00	12.58	10.17	0.02	Average	LINE
6	0.7160	26.29	-29.71	56.00	16.10	10.17	0.02	QP	LINE
7	1.0710	14.90	-31.10	46.00	4.71	10.17	0.02	Average	LINE
8	1.0710	24.14	-31.86	56.00	13.95	10.17	0.02	QP	LINE
9	1.1907	27.73	-18.27	46.00	17.53	10.17	0.03	Average	LINE
10	1.1907	29.19	-26.81	56.00	18.99	10.17	0.03	QP	LINE
11	19.7397	26.35	-23.65	50.00	15.82	10.41	0.12	Average	LINE
12	19.7397	31.60	-28.40	60.00	21.07	10.41	0.12	QP	LINE

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

**Summary**

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
902-928MHz	-	-	-	-	-
RFID_Nss1_1TX	329.375k	285.625k	286KD1D	324.375k	271.25k

Max-N dB = Maximum 20dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;

Min-N dB = Minimum 20dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

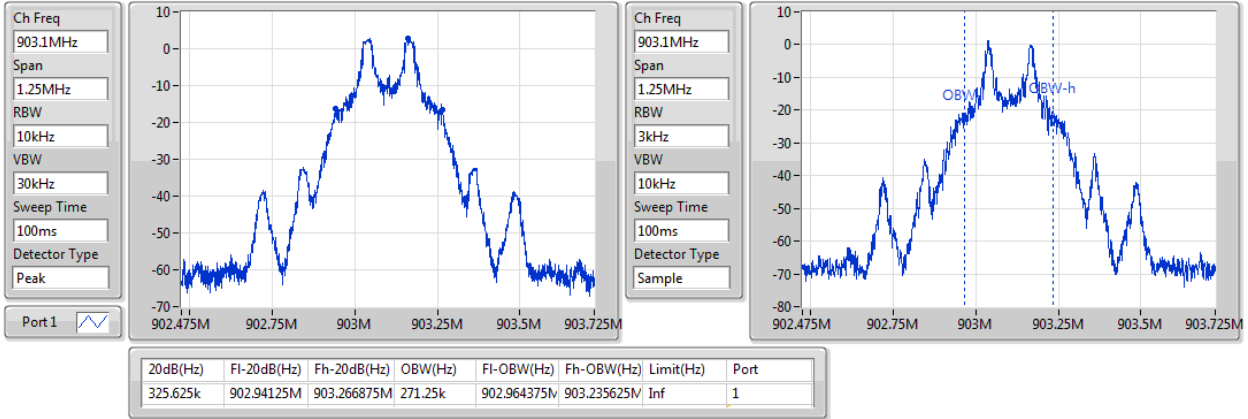
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
RFID_Nss1_1TX	-	-	-	-
903.1MHz	Pass	Inf	325.625k	271.25k
913.9MHz	Pass	Inf	329.375k	280k
926.95MHz	Pass	Inf	324.375k	285.625k

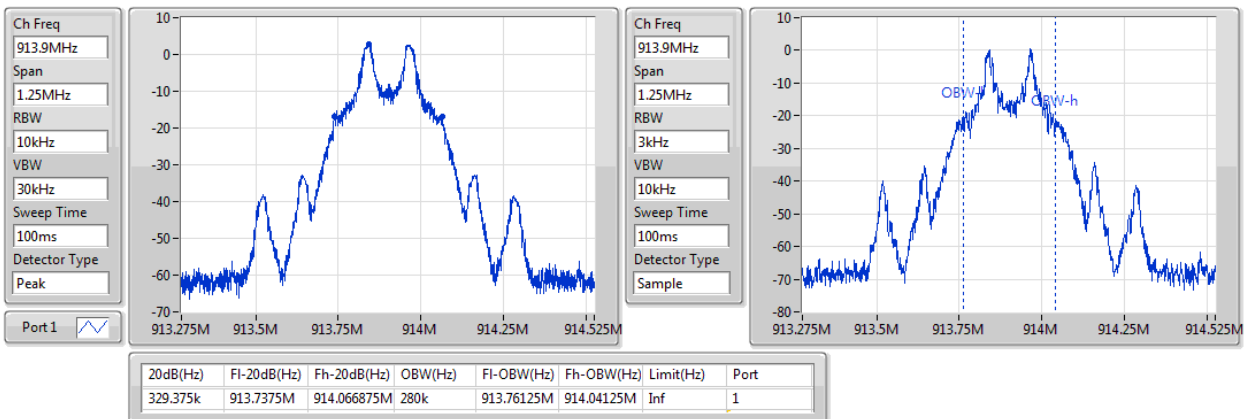
Port X-N dB = Port X 20dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

RFID_Nss1_1TX
EBW
903.1MHz

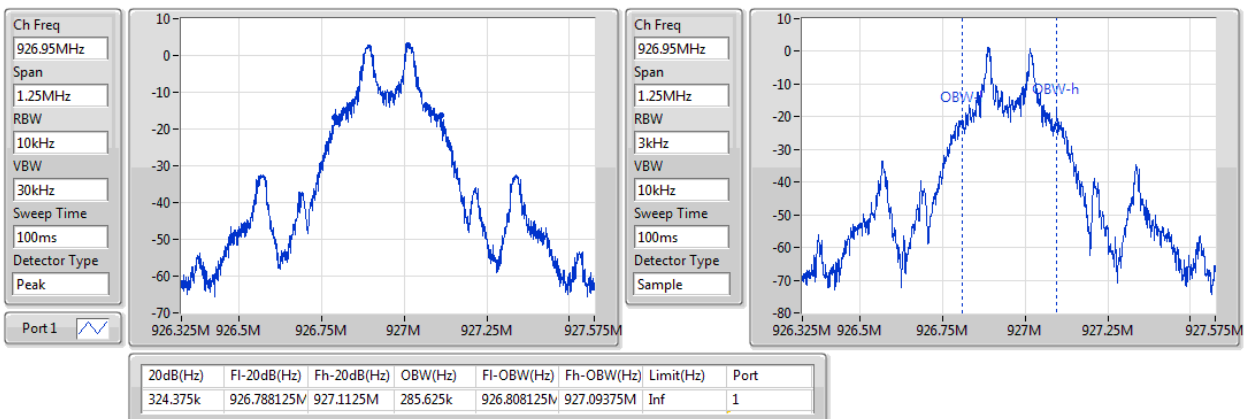
05/09/2018


RFID_Nss1_1TX
EBW
913.9MHz

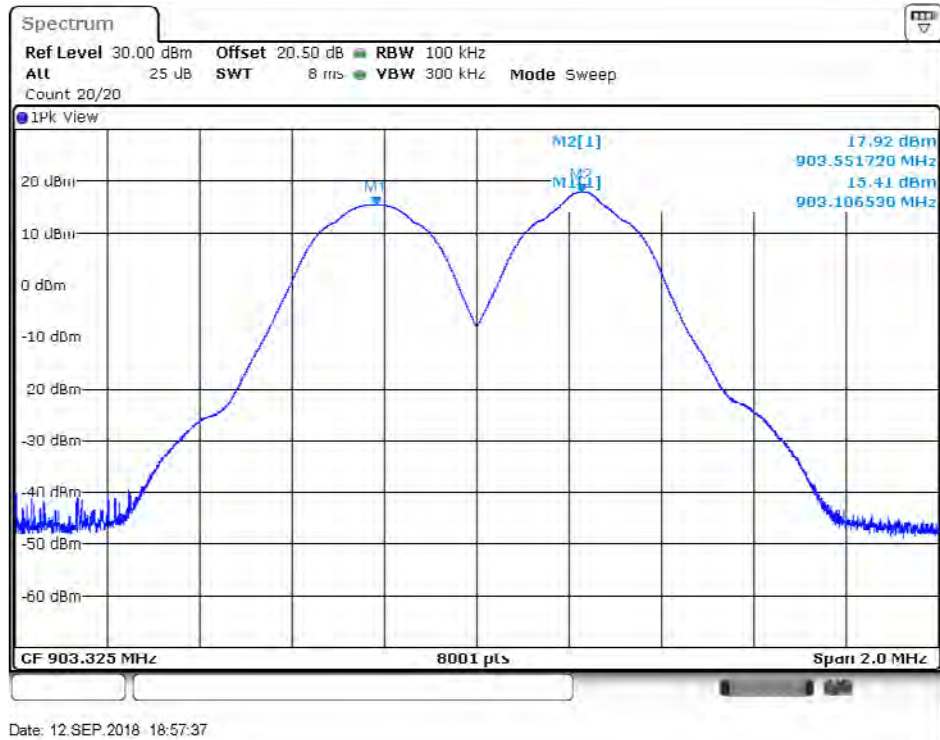
05/09/2018


RFID_Nss1_1TX
EBW
926.95MHz

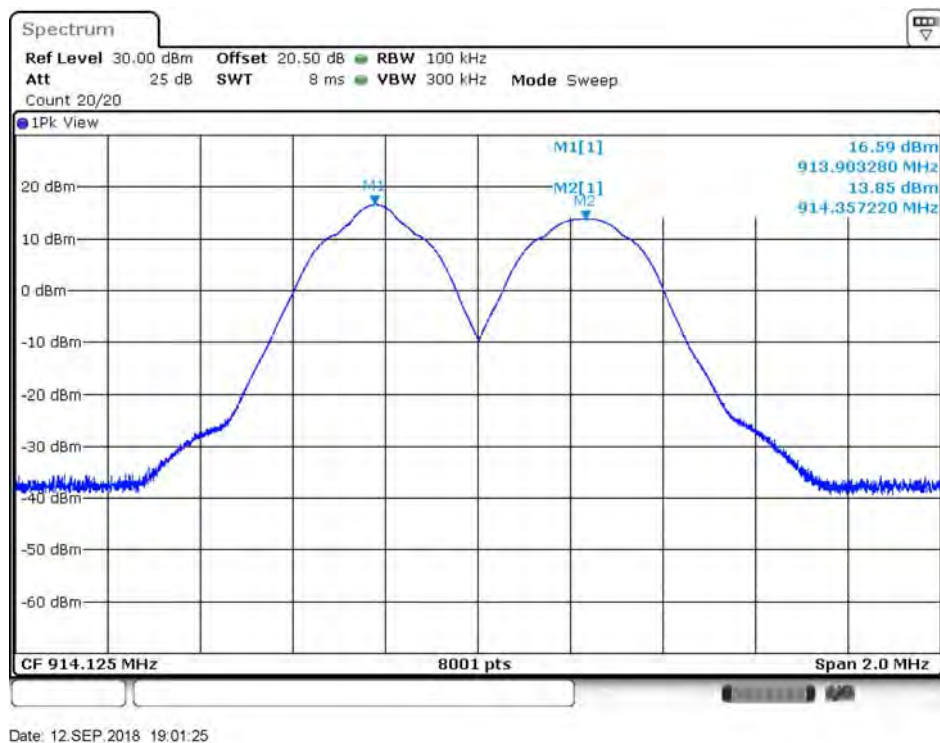
05/09/2018



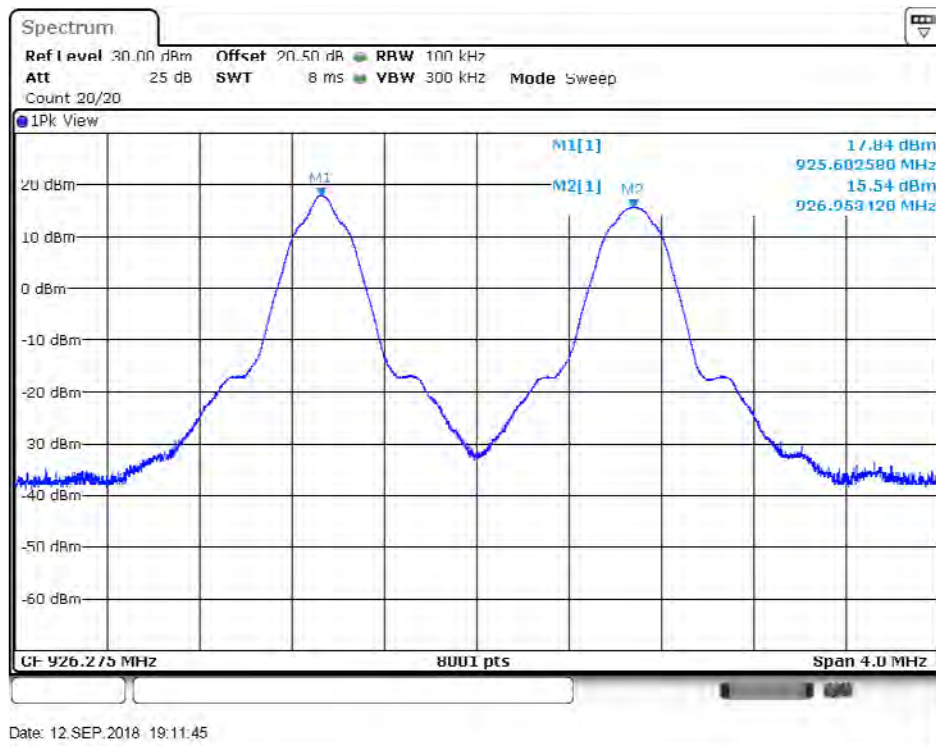
Channel Separation Plot / Channel 1 / 903.10 MHz ~ 903.55 MHz



Channel Separation Plot / Channel 25 / 913.90 MHz ~ 914.35 MHz



Channel Separation Plot / Channel 50 / 925.60 MHz ~ 926.95 MHz



**Summary**

Mode	Power	Power
	(dBm)	(W)
902-928MHz	-	-
RFID_Nss1_1TX	27.42	0.55208

Result

Mode	Result	Gain	Power	Power Limit
		(dBi)	(dBm)	(dBm)
RFID_Nss1_1TX	-	-	-	-
903.1MHz	Pass	6.60	27.18	29.40
913.9MHz	Pass	6.60	27.24	29.40
926.95MHz	Pass	6.60	27.42	29.40

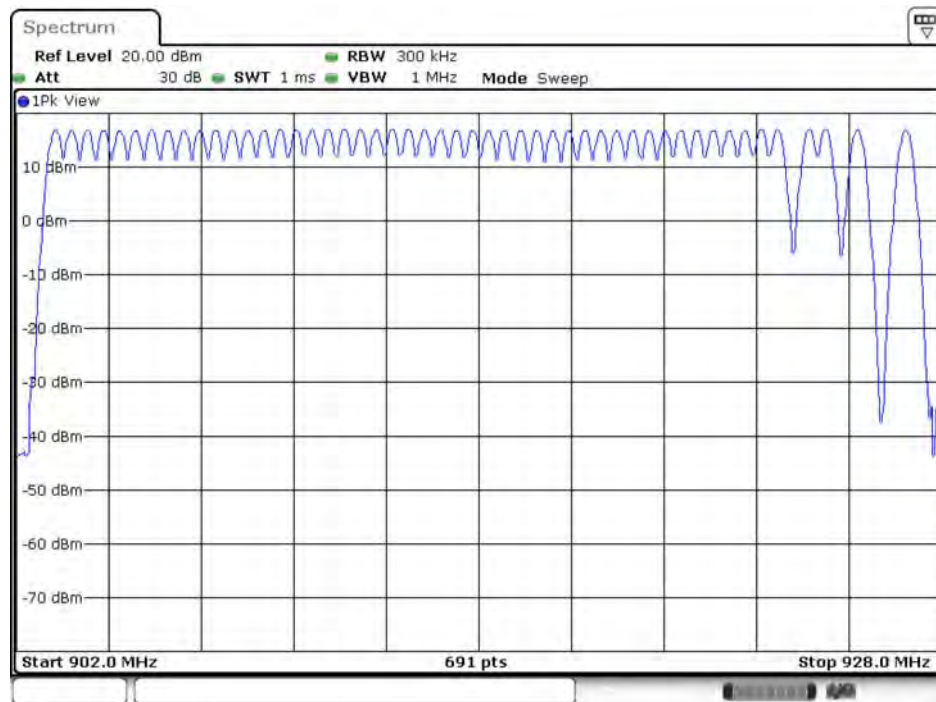
Summary

Mode	Power (dBm)	Power (W)
902-928MHz	-	-
RFID_Nss1_1TX	29.29	0.84918

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
RFID_Nss1_1TX	-	-	-	-
903.1MHz	Pass	6.60	29.27	29.40
913.9MHz	Pass	6.60	29.25	29.40
926.95MHz	Pass	6.60	29.29	29.40

Number of Hopping Channel Plot / Channel 1~50 / 903.1 MHz ~ 926.95 MHz



Date: 12-SEP-2018 16:49:42

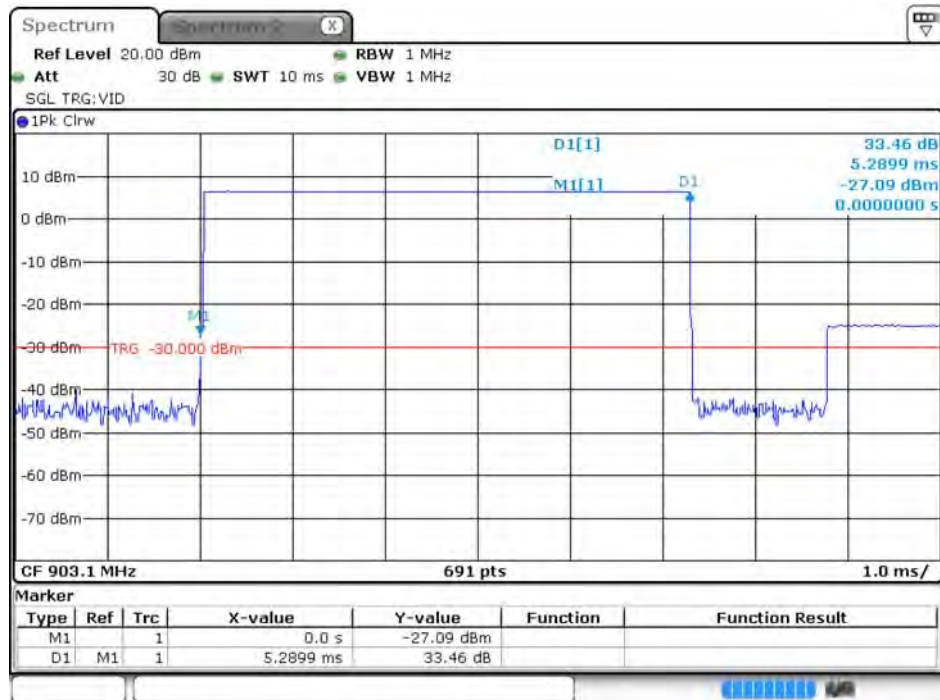


Dwell Time Result

Appendix E

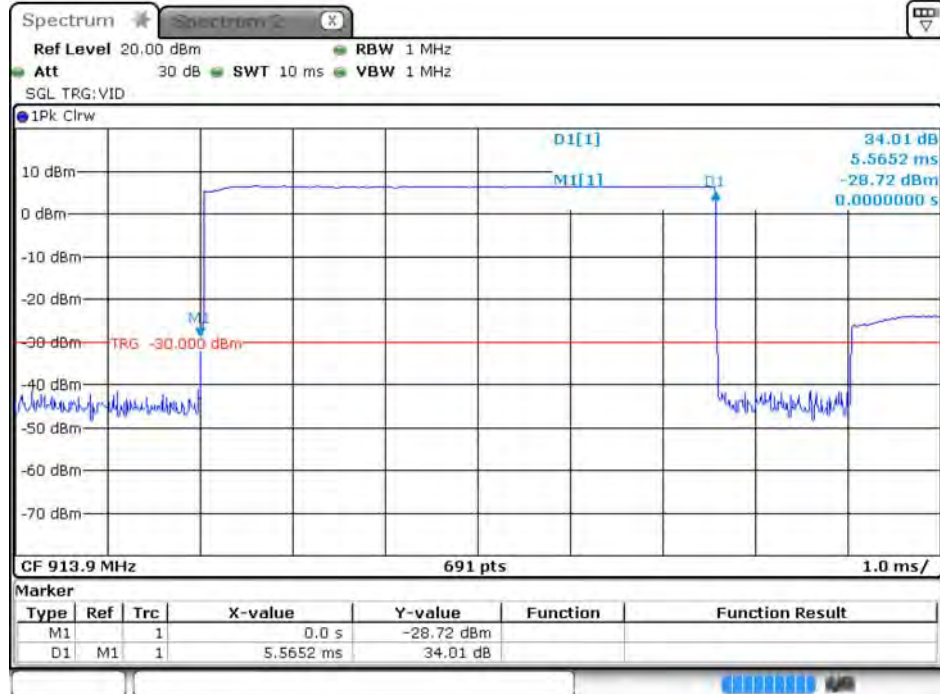
Frequency (MHz)	Pulse Duration (ms)	Pulse number within 10s	Dwell Time (s)	Limits (s)	Test Result
903.1 MHz	5.29	1	0.0053	0.4	Complies
913.9 MHz	5.57	1	0.0056	0.4	Complies
926.95 MHz	6.03	1	0.0060	0.4	Complies

Dwell Time Plot on Pulse Duration / Channel 1 / 903.1 MHz



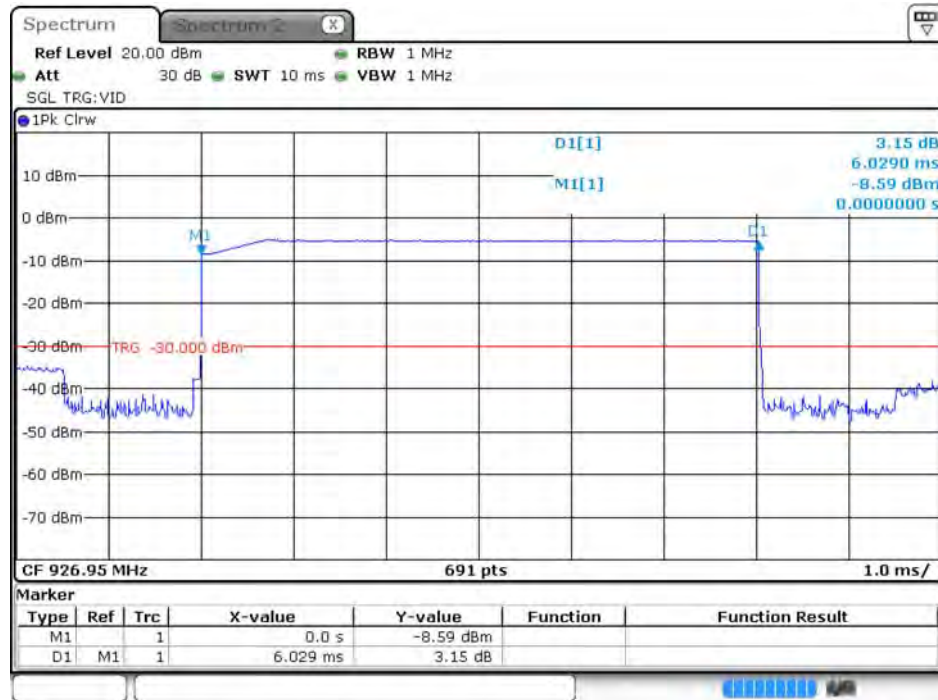
Date: 13.SEP.2018 11:47:10

Dwell Time Plot on Pulse Duration / Channel 25 / 926.95 MHz

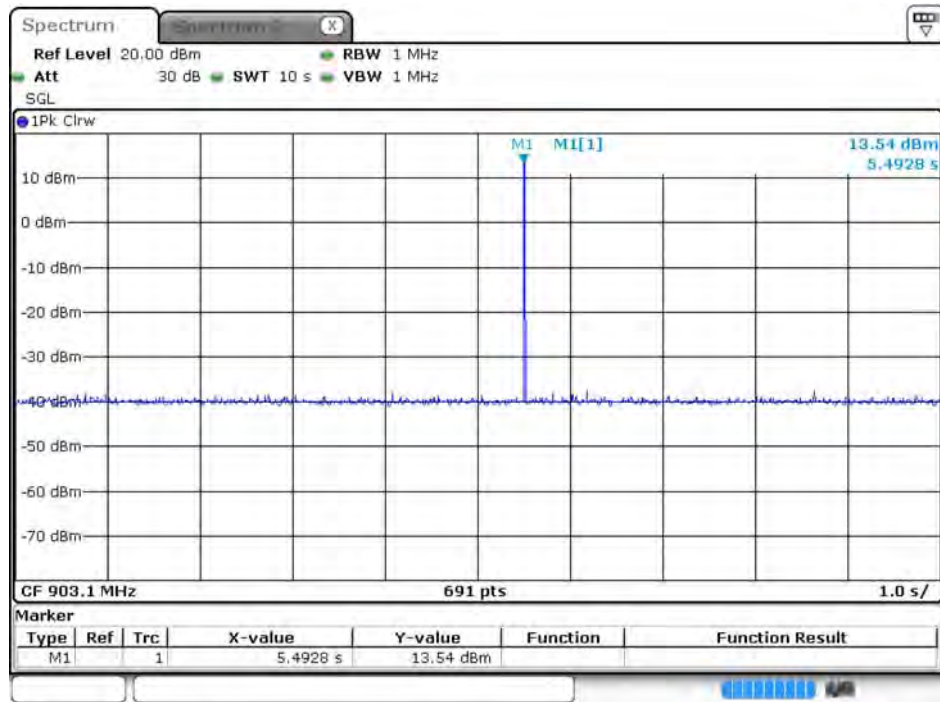


Date: 13.SEP.2018 11:40:20

Dwell Time Plot on Pulse Duration / Channel 50 / 926.95 MHz

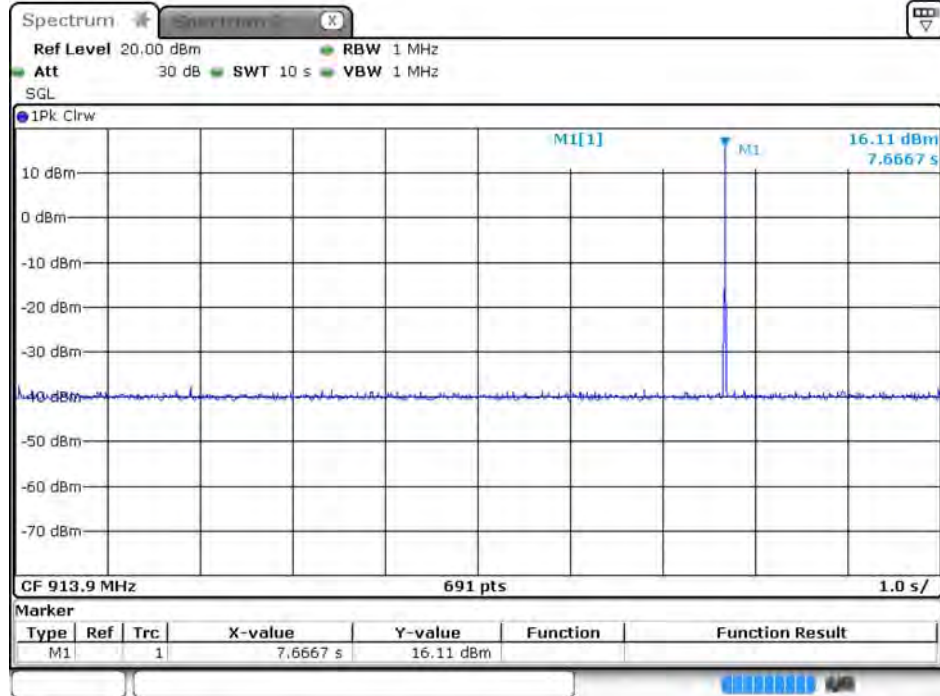


Dwell Time Plot on Pulse number within 10s / Channel 1 / 903.1 MHz



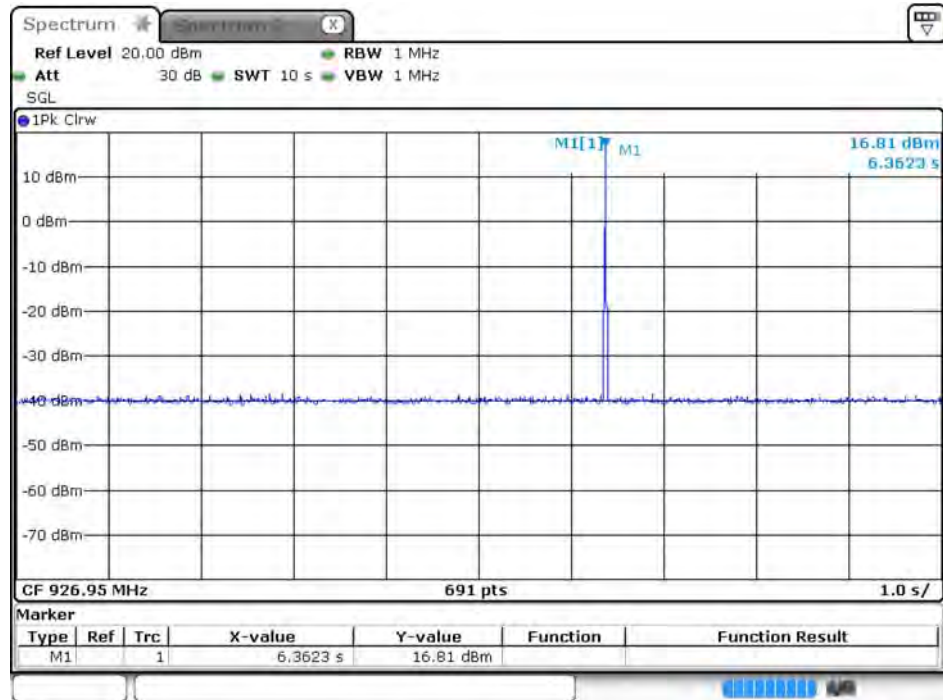
Date: 13.SEP.2018 11:55:47

Dwell Time Plot on Pulse number within 10s / Channel 25 / 926.95 MHz



Date: 13.SEP.2018 11:56:44

Dwell Time Plot on Pulse number within 10s / Channel 50 / 926.95 MHz



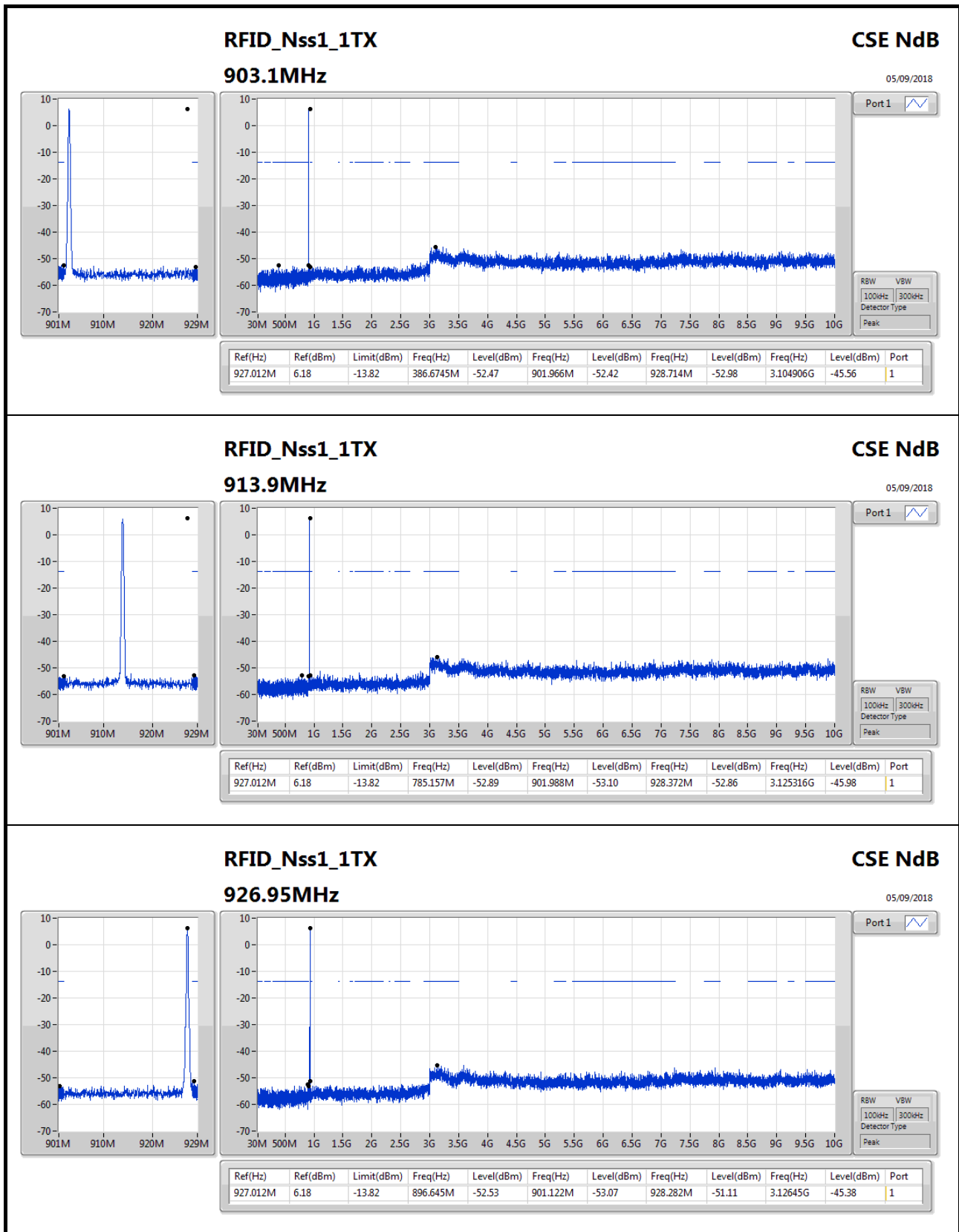
Date: 13.SEP.2018 12:10:06

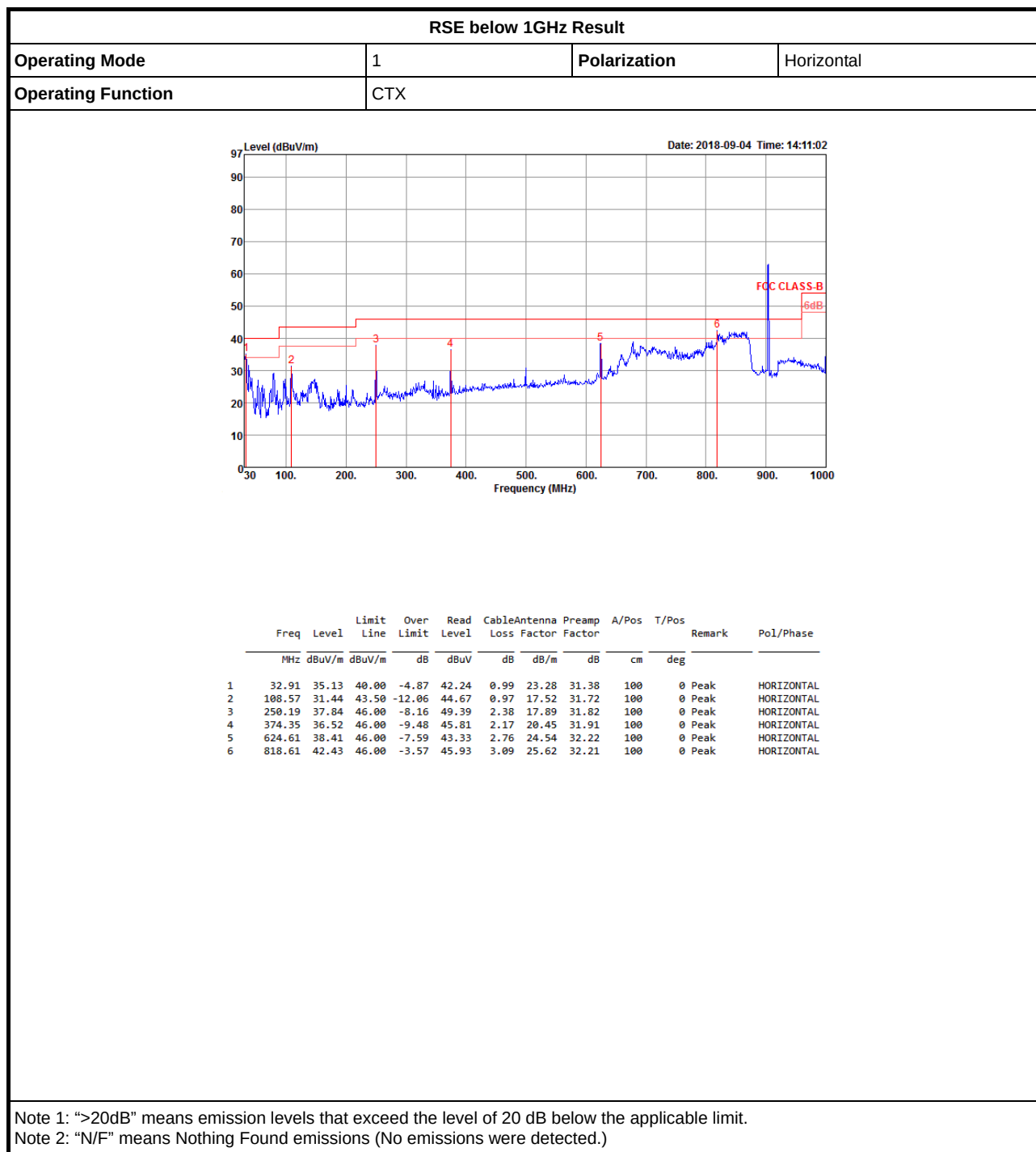
Summary

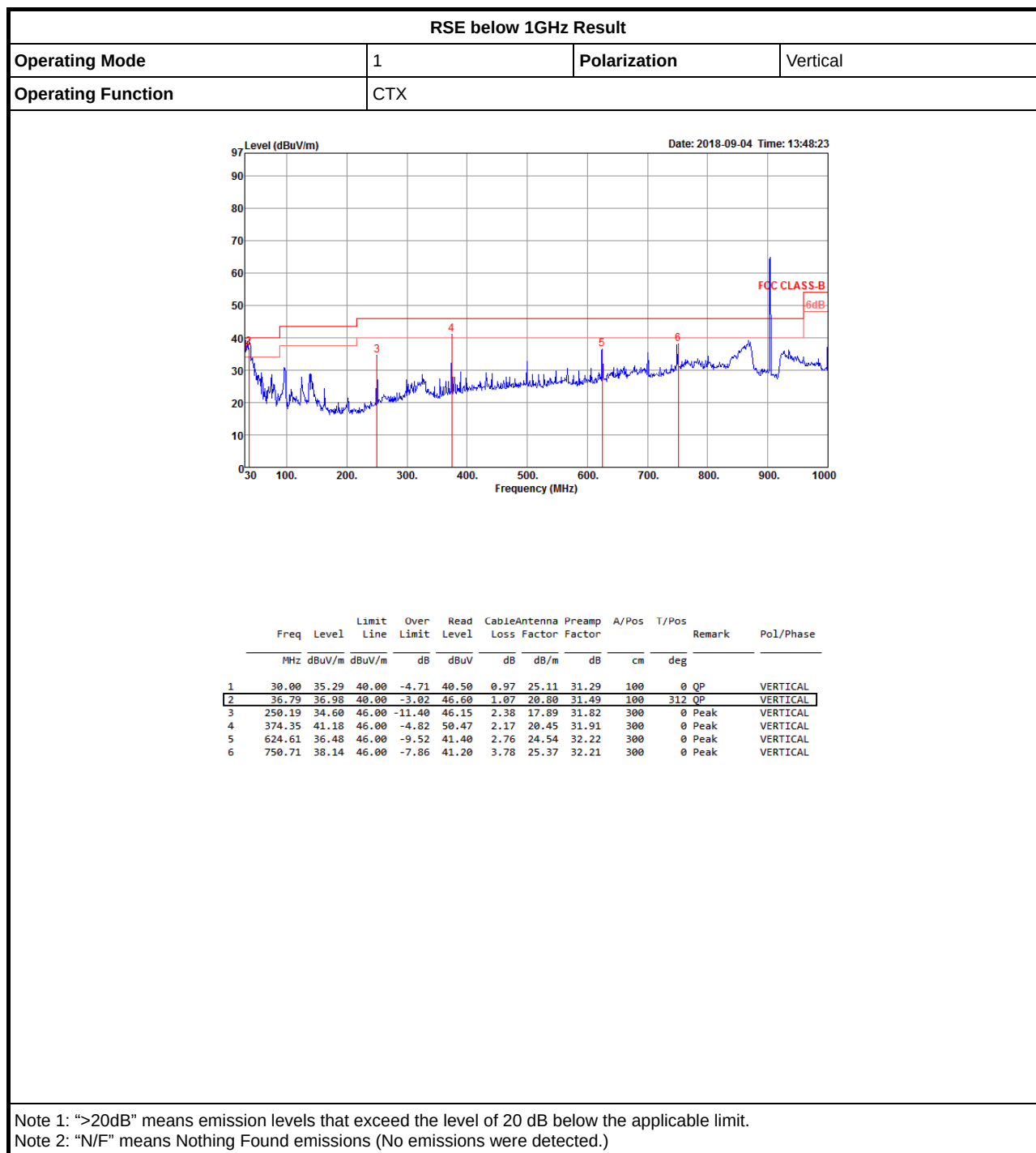
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
902-928MHz	-	-	-	-	-	-	-	-	-	-	-	-	-
RFID_Nss1_1TX	Pass	927.012M	6.18	-13.82	896.645M	-52.53	901.122M	-53.07	928.282M	-51.11	3.12645G	-45.38	1

Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
RFID_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
903.1MHz	Pass	927.012M	6.18	-13.82	386.6745M	-52.47	901.966M	-52.42	928.714M	-52.98	3.104906G	-45.56	1
913.9MHz	Pass	927.012M	6.18	-13.82	785.157M	-52.89	901.988M	-53.10	928.372M	-52.86	3.125316G	-45.98	1
926.95MHz	Pass	927.012M	6.18	-13.82	896.645M	-52.53	901.122M	-53.07	928.282M	-51.11	3.12645G	-45.38	1







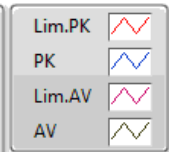
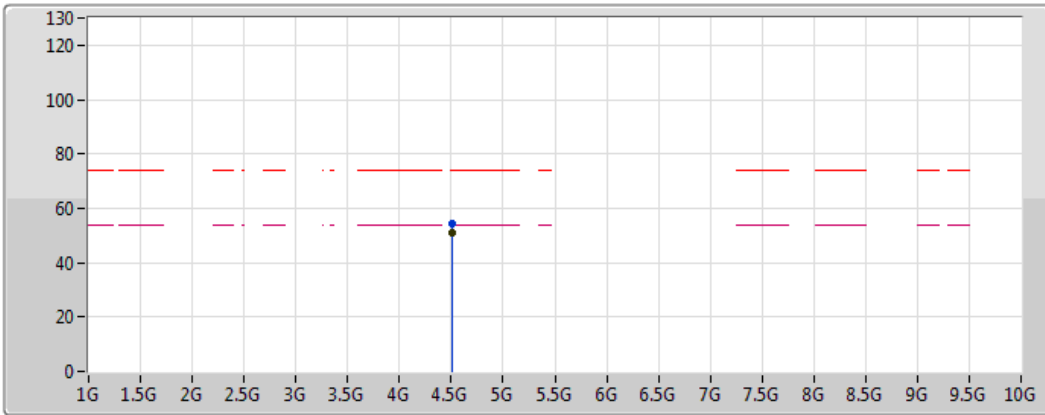
**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
RFID_Nss1,(6Mbps)_1TX	Pass	AV	4.51548G	50.32	54.00	-3.68	3.23	3	Vertical	186	2.48	-

RFID_Nss1,(6Mbps)_1TX

903.1MHz_TX

04/09/2018



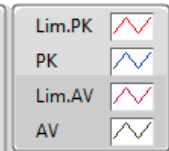
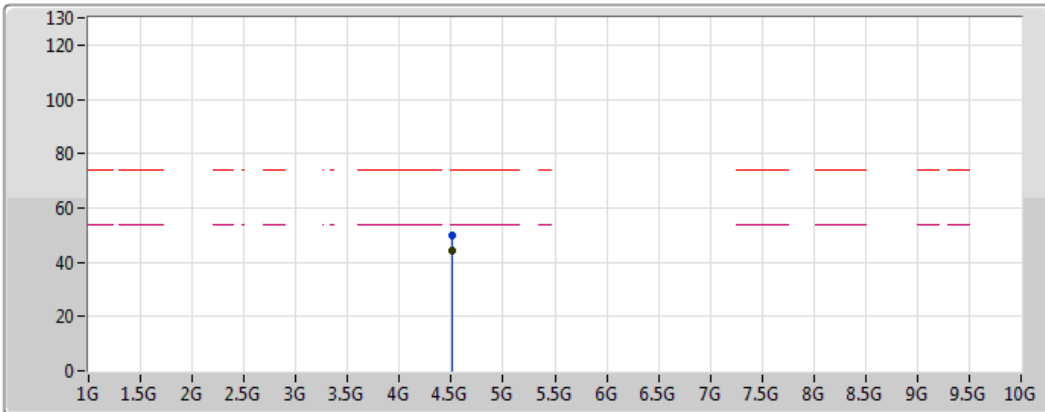
EUT Z_1TX_RFID
Setting 315
01-K-3
FSP
Port1

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	4.51552G	54.21	74.00	-19.79	3.23	3	Vertical	193	1.50	-
AV	4.5155G	50.76	54.00	-3.24	3.23	3	Vertical	193	1.50	-

RFID_Nss1,(6Mbps)_1TX

903.1MHz_TX

04/09/2018



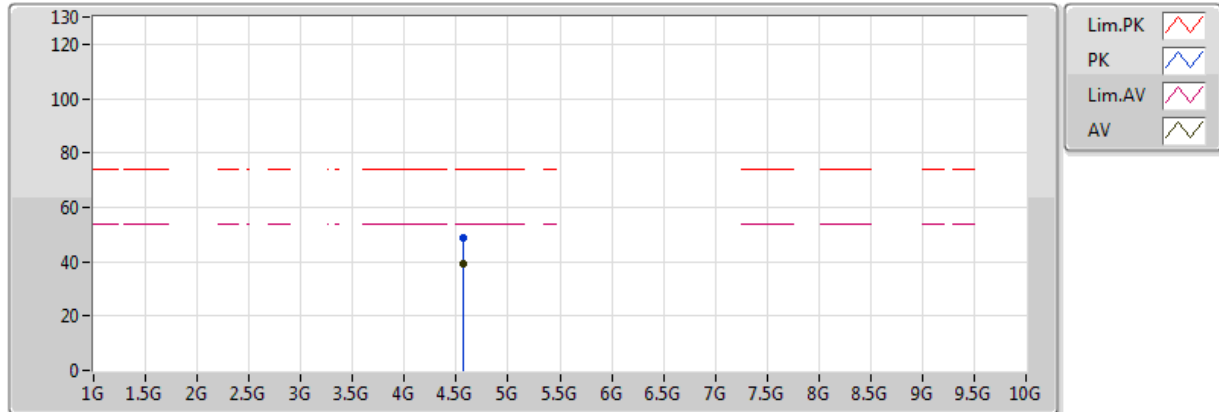
EUT_Z_1TX_RFID
Setting 315
01-K-3
FSP
Port1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	4.51544G	49.85	74.00	-24.15	3.23	3	Horizontal	204	2.16	-
AV	4.51552G	44.16	54.00	-9.84	3.23	3	Horizontal	204	2.16	-

RFID_Nss1,(6Mbps)_1TX

913.9MHz_TX

04/09/2018



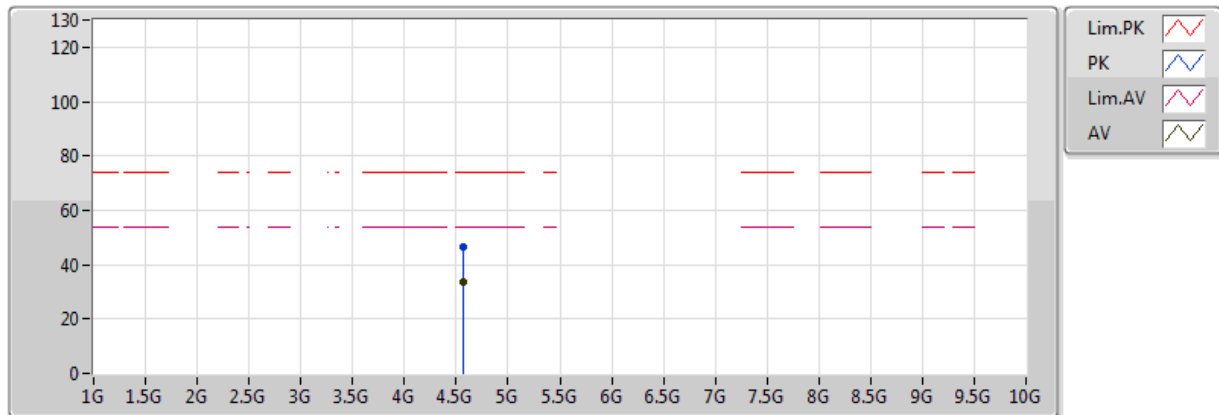
EUT_Z_1TX_RFID
Setting 315
01-K-3
FSP
Port1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	4.56932G	48.73	74.00	-25.27	3.35	3	Vertical	196	2.02	-
AV	4.56948G	39.46	54.00	-14.54	3.35	3	Vertical	196	2.02	-

RFID_Nss1,(6Mbps)_1TX

913.9MHz_TX

04/09/2018



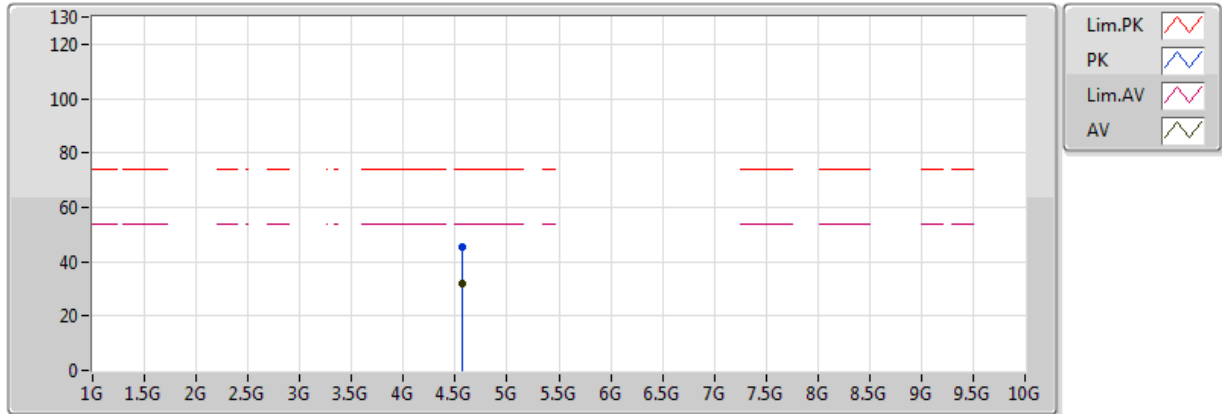
EUT_Z_1TX_RFID
Setting 315
01-K-3
FSP
Port1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	4.56966G	46.47	74.00	-27.53	3.35	3	Horizontal	214	1.70	-
AV	4.56952G	33.74	54.00	-20.26	3.35	3	Horizontal	214	1.70	-

RFID_Nss1,(6Mbps)_1TX

926.95MHz_TX

04/09/2018



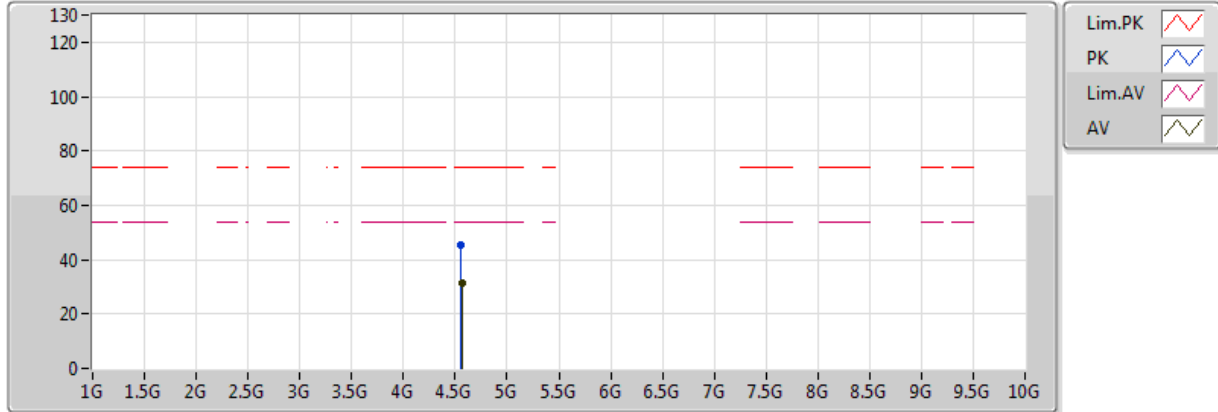
EUT_Z_1TX_RFID
Setting 315
01-K-3
FSP
Port1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	4.56042G	45.61	74.00	-28.39	3.33	3	Vertical	23	1.14	-
AV	4.56672G	32.09	54.00	-21.91	3.34	3	Vertical	23	1.14	-

RFID_Nss1,(6Mbps)_1TX

926.95MHz_TX

04/09/2018



EUT_Z_1TX_RFID
Setting 315
01-K-3
FSP
Port1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	4.55952G	45.63	74.00	-28.37	3.32	3	Horizontal	241	1.13	-
AV	4.56538G	31.11	54.00	-22.89	3.34	3	Horizontal	241	1.13	-