FCC Test Report

Equipment	:	**XB6 Lora**
Brand Name	:	**Technicolor**
Model No.	:	**Type1QM**
FCC ID	:	**G95LORMOD01**
Standard	:	**47 CFR FCC Part 15.247**
Operating Band	:	**902 - 928 MHz**
Applicant / Manufacturer	:	**Technicolor Connected Home USA LLC 5030 Sugarloaf Parkway, Building 6 Lawrenceville, Georgia United States 30044**

The product sample received on Dec. 12, 2017 and completely tested on Dec. 28, 2017. We, SPORTON, 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 test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Phoenix Chen / Assistant Manager

Testing Laboratory
1190

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Summary of Test Result

Conformance Test Specifications				
Report Clause	**Ref. Std. Clause**	**Description**	**Limit**	**Result**
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	FCC 15.207	Complied
3.2	15.247(a)	DTS Bandwidth	≥500kHz	Complied
3.3	15.247(b)	Maximum Conducted Output Power	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: > 30 dBc	Complied
3.6	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied

Revision History

Report No.	Version	Description	Issued Date
FR7D0750	Rev. 01	Initial issue of report	Mar. 16, 2018
FR7D0750	Rev. 02	Revise Model Name (This report is the latest version replacing for the report issued on Mar. 16, 2018)	Mar. 30, 2018

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range	Modulation	Ch. Frequency (MHz)	Channel Number
902 - 928 MHz	CSS	923.3-927.5	0-7 [8]

Band	Mode	BWch (MHz)	Nant
902 - 928MHz	LoRa (500kHz)	0.5	1TX
902 - 928MHz	LoRa (125kHz)	0.5	1RX

Note:
- 902-928 MHz Band uses a combination of Chip Spread Spectrum(CSS) modulation.
- BWch is the nominal channel bandwidth.
- LoRa (125kHz) is use for RX only.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Airgain	M915LSUTCH	Embedded	I-Pex	2.3

1.1.3 EUT Operational Condition

Operational Condition		
EUT Power Type	From AC Adapter	
Type of EUT		
☒	Stand-alone	
☐	Combined (EUT where the radio part is fully integrated within another device)	
	Combined Equipment - Brand Name / Model No.:	…
☐	Plug-in radio (EUT intended for a variety of host systems)	
	Host System - Brand Name / Model No.:	…
☐	Other:	

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
LoRa (500kHz)	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

1.1.5 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
- ANSI C63.10-2013
- KDB 558074 D01 v04

1.2 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
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH06-HY	Barry	23.5°C / 65%	27/Dec/2017
Radiated	03CH03-HY	Jeff	21.3°C / 56%	28/Dec/2017
AC Conduction	CO04-HY	Thor	24.5°C / 41%	25/Dec/2017

1.3 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)	3.6 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

Condition Item	Abbreviation/Remark	Remark
RF Conducted-DTS	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	110V

2.2 Test Channel Mode

Test Software	Dos

Mode	Power Setting
LoRa (500kHz)	-
923.3MHz	Default
925.1MHz	Default
927.5MHz	Default

2.3 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	Adapter mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density 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	CTX		
1	Adapter mode		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT			V

2.4 Support Equipment

Support Equipment - Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Test fixture	Technicolor	XB6	-
2	Antenna	-	-	-

Note.Support equipment No.1,2 was provided by customer.

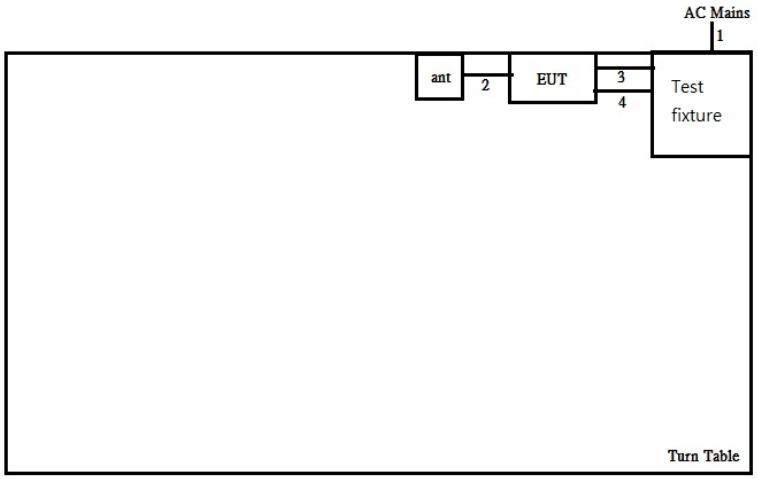
Support Equipment - Radiated				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Test fixture	Technicolor	XB6	-
2	Antenna	-	-	-

Note.Support equipment No.1,2 was provided by customer.

Support Equipment_- RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5410	DoC
2	Adapter for NB	DELL	HA65NM130	DoC
3	Test fixture	Technicolor	XB6	-

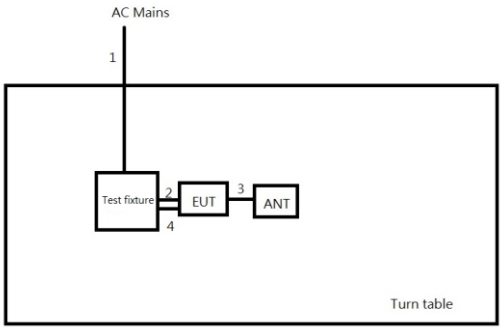
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	AC Power cable	No	1.8m
2	RF Cable	No	0.11m
3	flexible flat cable	No	0.04m
4	DC Power cable	No	0.06m

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length
1	AC power line	No	1.8m
2	flexible flat cable	No	0.04m
3	RF cable	No	0.11m
4	DC power line	No	0.06m

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

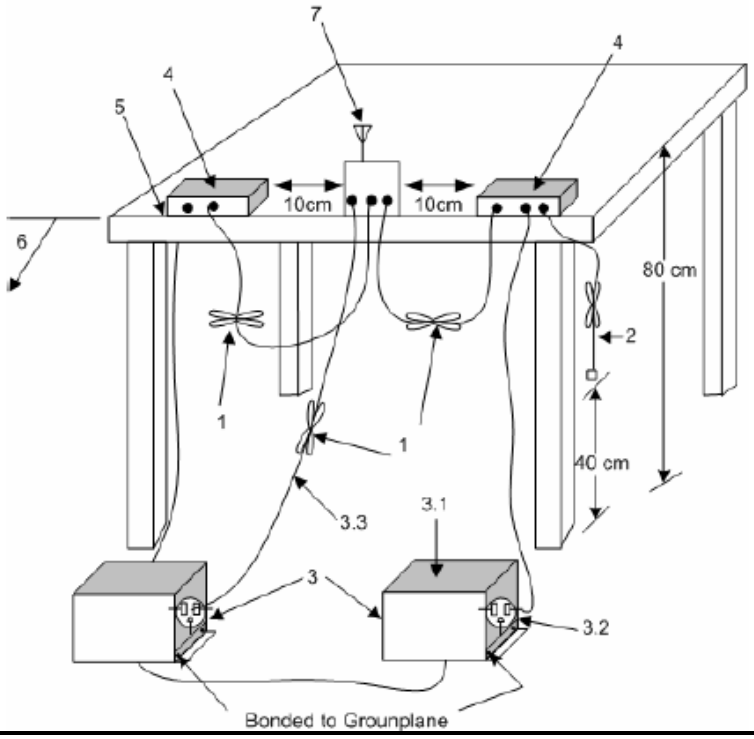
Refer a test equipment and calibration data table in this test report.

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

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
▪ 6 dB bandwidth ≥ 500 kHz.

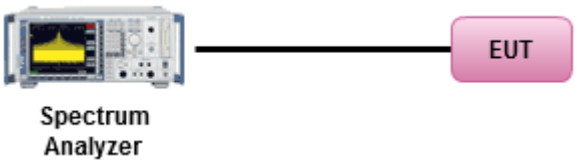
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ Refer as KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.
	☐ Refer as KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
	☐ Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.

3.2.4 Test Setup

Emission Bandwidth


3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit		
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)	
	▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)$ dBm	
	▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm	
	▪ Smart antenna system (SAS):	
		- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm
		- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm
		- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3 + 8$dB dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.		

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
▪ Maximum Peak Conducted Output Power	
	☐ Refer as KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
	☐ Refer as KDB 558074, clause 9.1.2 Option 2 (integrated band power method)
	☐ Refer as KDB 558074, clause 9.1.3 Option 3 (peak power meter for VBW ≥ DTS BW)
▪ Maximum Average Conducted Output Power	
	Duty cycle ≥ 98%
	☐ Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
	Duty cycle < 98%
	☐ Refer as KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	RF power meter and average over on/off periods with duty factor or gated trigger
	☒ Refer as KDB 558074, clause 9.2.3.1 Method AVGPM (using an RF average power meter).
▪ For conducted measurement.	
	▪ If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)


3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
▪ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

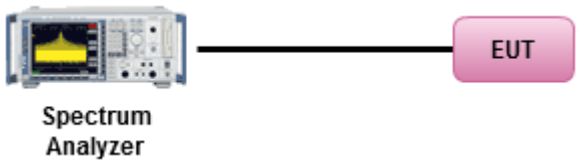
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method		
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).		
	☒ Refer as KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		▪ Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.4.4 Test Setup

Power Spectral Density


3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	**Limit (dB)**
Peak output power procedure	20
Average output power procedure	30
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. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

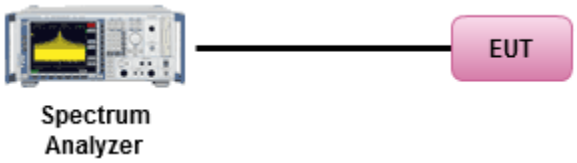
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
▪ Refer as KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands


3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 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.

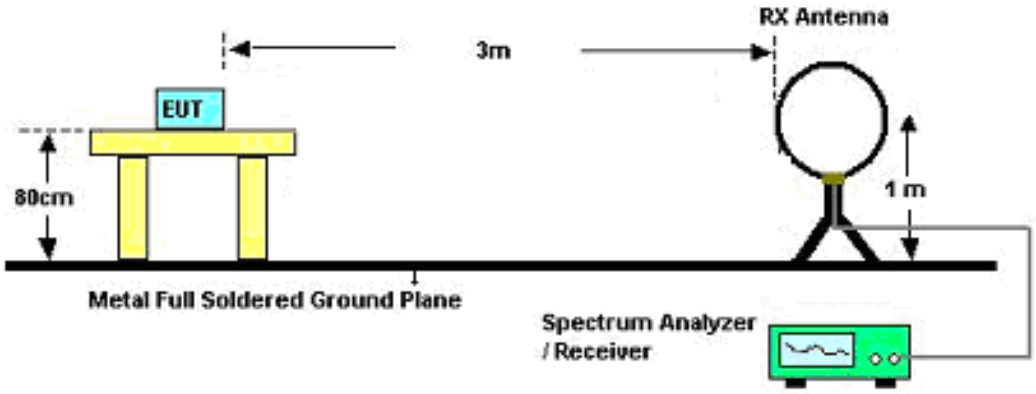
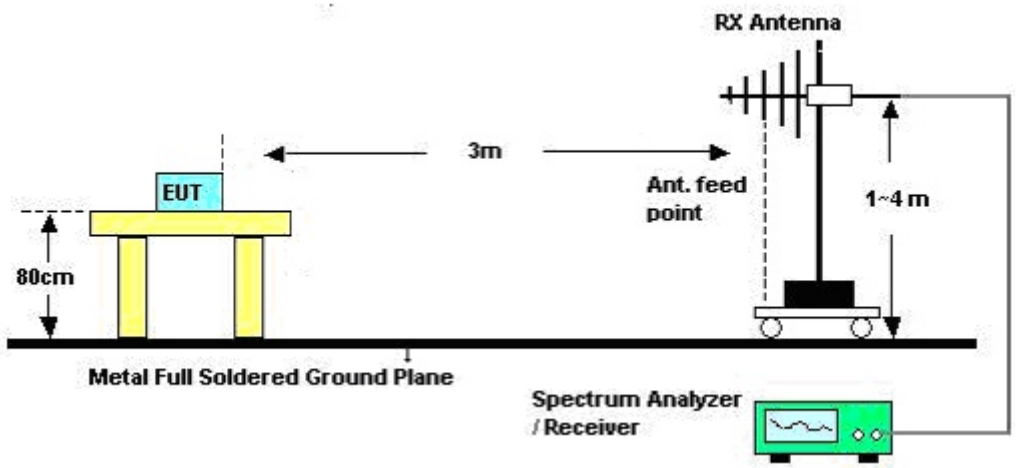
3.6.2 Measuring Instruments

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

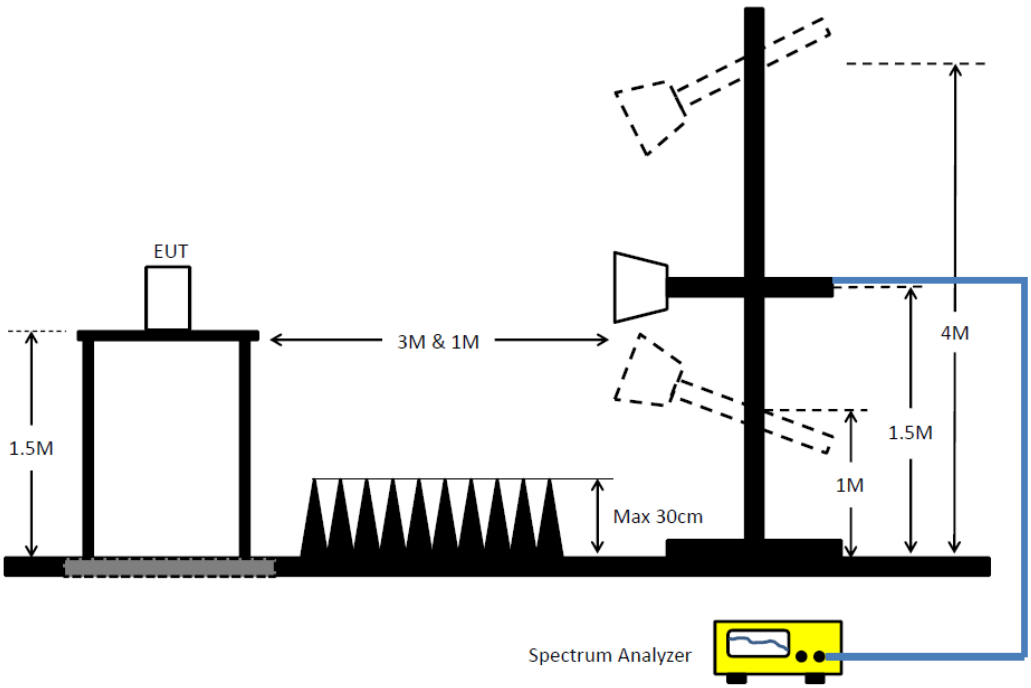
3.6.3 Test Procedures

Test Method
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
▪ Refer as ANSI C63.10, clause 6.10.3 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 KDB 558074, clause 12 for unwanted emissions into restricted bands.
☒ Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW≥1/T.
☒ Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.
▪ For the transmitter band-edge emissions shall be measured using following options below:
▪ Refer as KDB 558074 clause 13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
▪ Refer as KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
▪ Refer as KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
▪ For conducted and cabinet radiation measurement, refer as KDB 558074, clause 12.2.2.
▪ For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
▪ For KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.6.4 Test Setup

Transmitter Radiated Emissions
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



3.6.5 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.

3.6.6 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR3	102052	9KHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	06/Oct/2017	05/Oct/2018
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Puls e Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2017	11/Oct/2018
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	17/Nov/2017	16/Nov/2018

NCR : Non-Calibration Require

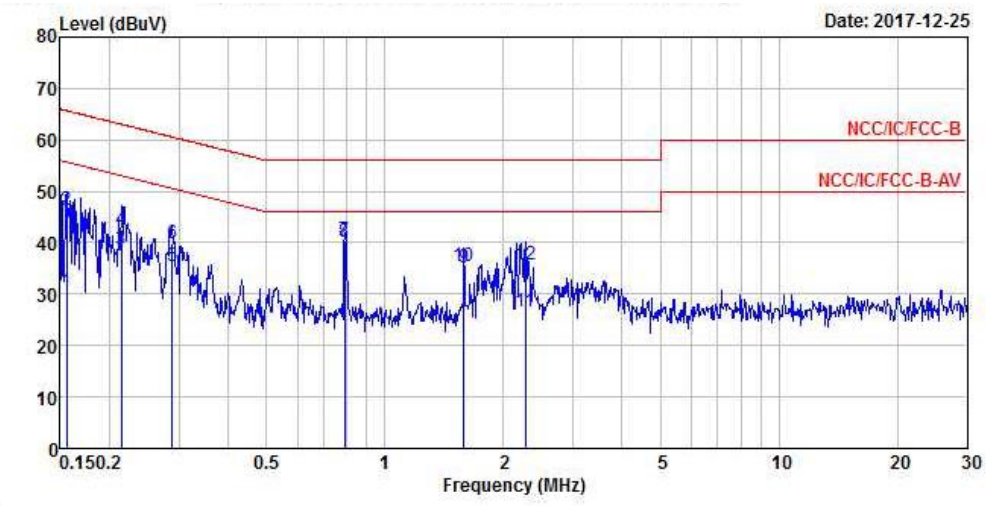
Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	31/Oct/2017	30/Oct/2018
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	01/Nov/2017	31/Oct/2018
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	19/Apr/2017	18/Apr/2018
Amplifier	Keysight	83017A	MY53270196	1GHz ~ 26.5GHz	31/Aug/2017	30/Aug/2018
Spectrum	R&S	FSV40	101500	9kHz ~ 40GHz	28/Jun/2017	27/Jun/2018
Receiver	R&S	ESR3	102052	9KHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	26/Jan/2017	25/Jan/2018
RF Cable-high	SUHNER	SUCOFLEX106	CB222	1GHz ~ 40GHz	26/Jan/2017	25/Jan/2018
Bilog Antenna	SCHAFFNER	CBL 6112B	22237	30MHz ~ 1GHz	08/Jul/2017	07/Jul/2018
Horn Antenna	SCHWARZBECK	BBHA9120D	1531	1GHz ~ 18GHz	25/Apr/ 2017	24/Apr/2018
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	02/Mar/2017	01/Mar/2018

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101515	9kHz~40GHz	08/Dec/2017	07/Dec/2018
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	27/Jul/2017	26/Jul/2018
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	10/Feb/2017	09/Feb/2018
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	10/Feb/2017	09/Feb/2018
RF Cable-1.5m	HUBER+SUHNER	SUCOFLEX_104	MY12582/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10710/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10709/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10713/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018

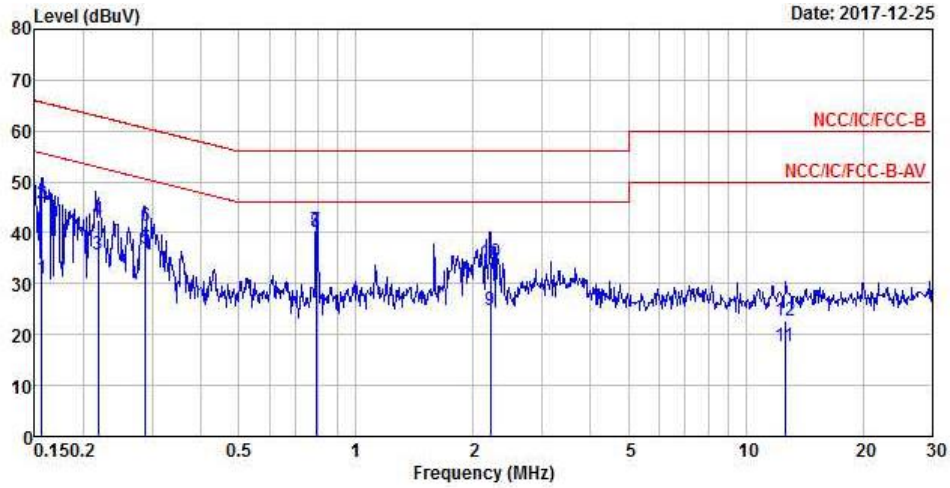
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	Adapter mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1557	30.49	-25.20	55.69	20.82	9.63	0.04	Average
2	0.1557	46.48	-19.21	65.69	36.81	9.63	0.04	QP
3	0.2139	38.71	-14.34	53.05	29.08	9.62	0.01	Average
4	0.2139	42.59	-20.46	63.05	32.96	9.62	0.01	QP
5	0.2878	35.51	-15.08	50.59	25.85	9.61	0.05	Average
6	0.2878	39.77	-20.82	60.59	30.11	9.61	0.05	QP
7 MAX	0.7918	40.55	-5.45	46.00	30.90	9.62	0.03	Average
8	0.7918	40.14	-15.86	56.00	30.49	9.62	0.03	QP
9	1.5851	35.25	-10.75	46.00	25.62	9.63	0.00	Average
10	1.5851	35.35	-20.65	56.00	25.72	9.63	0.00	QP
11	2.2726	26.53	-19.47	46.00	16.88	9.63	0.02	Average
12	2.2726	35.68	-20.32	56.00	26.03	9.63	0.02	QP

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	1	**Power Phase**	Line
Operating Function	Adapter mode		



		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.1565	31.09	-24.56	55.65	21.43	9.62	0.04	Average
2		0.1565	45.66	-19.99	65.65	36.00	9.62	0.04	QP
3		0.2185	35.67	-17.21	52.88	26.04	9.62	0.01	Average
4		0.2185	42.51	-20.37	62.88	32.88	9.62	0.01	QP
5		0.2878	36.98	-13.61	50.59	27.32	9.61	0.05	Average
6		0.2878	41.32	-19.27	60.59	31.66	9.61	0.05	QP
7	MAX	0.7918	40.48	-5.52	46.00	30.84	9.61	0.03	Average
8		0.7918	40.16	-15.84	56.00	30.52	9.61	0.03	QP
9		2.2132	24.79	-21.21	46.00	15.16	9.62	0.01	Average
10		2.2132	34.21	-21.79	56.00	24.58	9.62	0.01	QP
11		12.5821	17.83	-32.17	50.00	8.10	9.65	0.08	Average
12		12.5821	22.66	-37.34	60.00	12.93	9.65	0.08	QP

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	-	-	-	-	-
LoRa (500kHz)	602.5k	502.874k	503KF1D	595.625k	498.501k

Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

Result

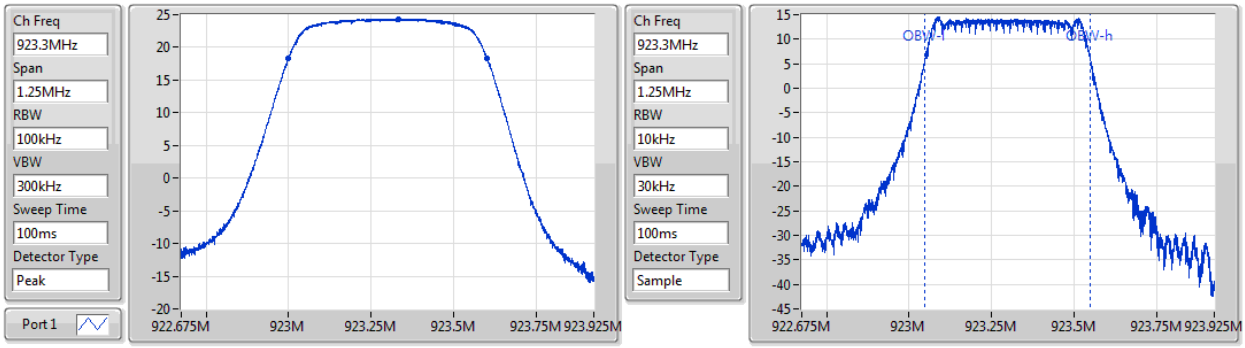
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
LoRa (500kHz)	-	-	-	-
923.3MHz_TnomVnom	Pass	500k	602.5k	501.624k
925.1MHz_TnomVnom	Pass	500k	595.625k	502.874k
927.5MHz_TnomVnom	Pass	500k	596.25k	498.501k

Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

LoRa (500kHz) **EBW**

923.3MHz

27/12/2017

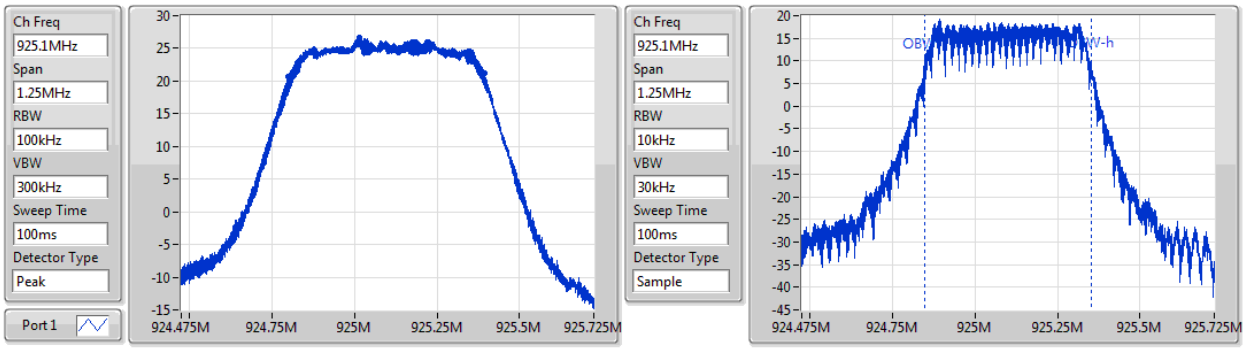


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
602.5k	922.99875M	923.60125M	501.624k	923.047626M	923.54925M	500k	1

LoRa (500kHz) **EBW**

925.1MHz

27/12/2017

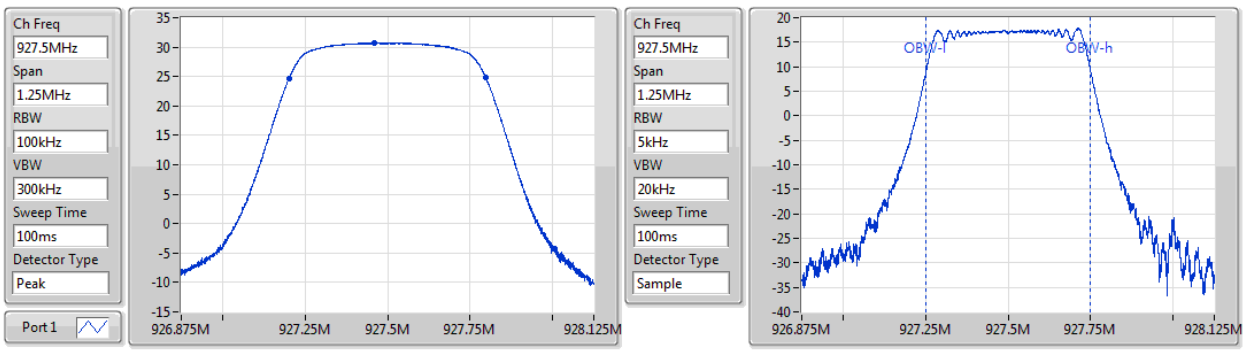


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
595.625k	924.799375M	925.395M	502.874k	924.848251M	925.351124M	500k	1

LoRa (500kHz) **EBW**

927.5MHz

27/12/2017



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
596.25k	927.20125M	927.7975M	498.501k	927.251999M	927.7505M	500k	1

Summary

Mode	Power	Power
	(dBm)	(W)
902-928MHz	-	-
LoRa (500kHz)	27.45	0.55590

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
LoRa (500kHz)	-	-	-	-
923.3MHz_TnomVnom	Pass	2.30	27.35	30.00
925.1MHz_TnomVnom	Pass	2.30	27.45	30.00
927.5MHz_TnomVnom	Pass	2.30	26.85	30.00

Summary

Mode	PD (dBm/RBW)
902-928MHz	-
LoRa (500kHz)	6.74

RBW=3kHz.

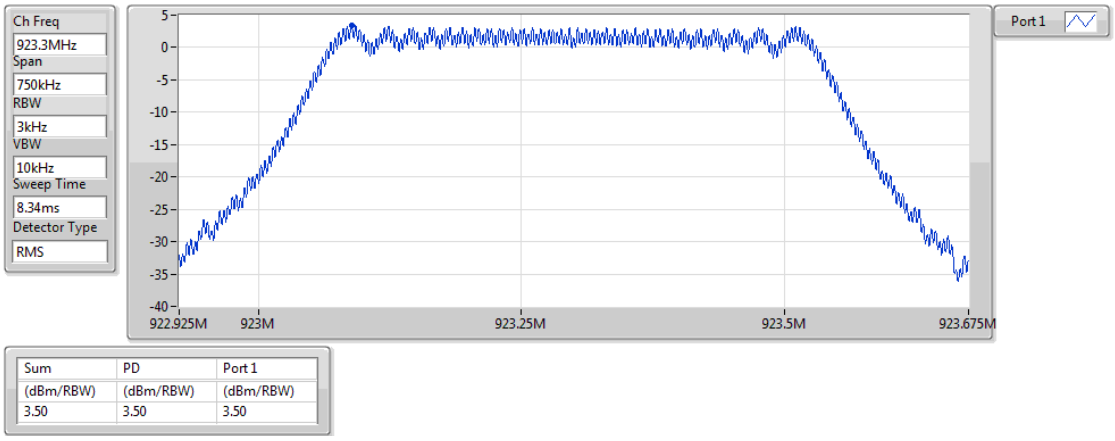
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
LoRa (500kHz)	-	-	-	-
923.3MHz_TnomVnom	Pass	2.30	3.50	8.00
925.1MHz_TnomVnom	Pass	2.30	5.97	8.00
927.5MHz_TnomVnom	Pass	2.30	6.74	8.00

RBW=3kHz.

LoRa (500kHz) **PSD**

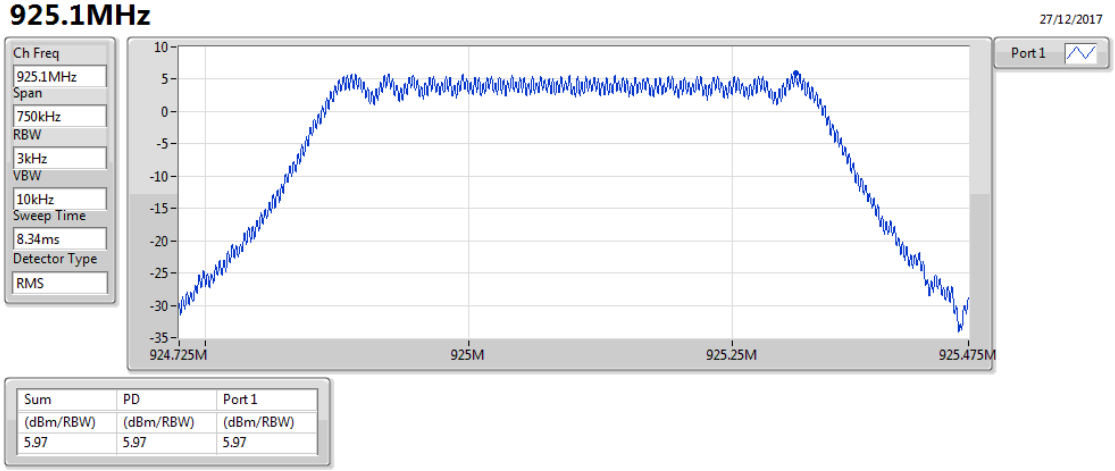
923.3MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.50	3.50	3.50

LoRa (500kHz) **PSD**

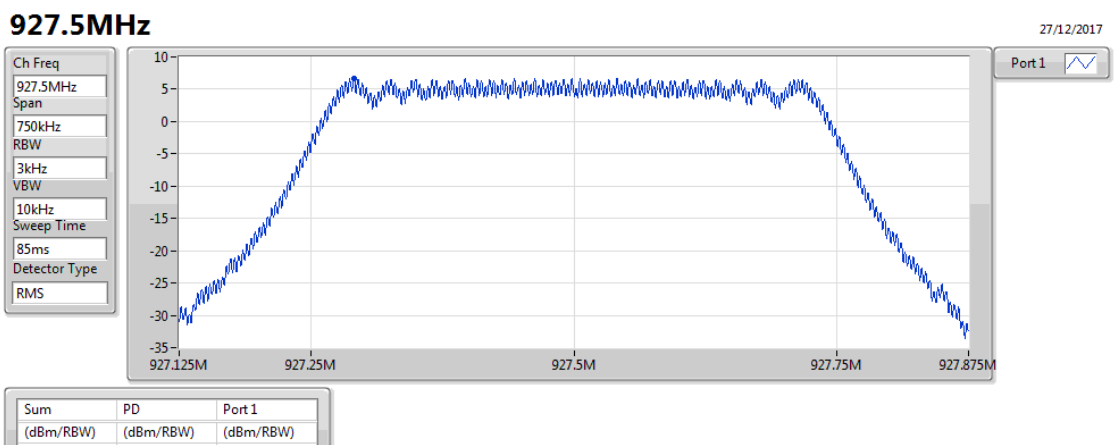
925.1MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
5.97	5.97	5.97

LoRa (500kHz) **PSD**

927.5MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
6.74	6.74	6.74

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	-	-	-	-	-	-	-	-	-	-	-	-	-
LoRa (500kHz)	Pass	927.48M	27.67	-2.74	897.0805M	-50.08	901.51M	-50.53	928.002M	-6.86	1.854242G	-24.33	1

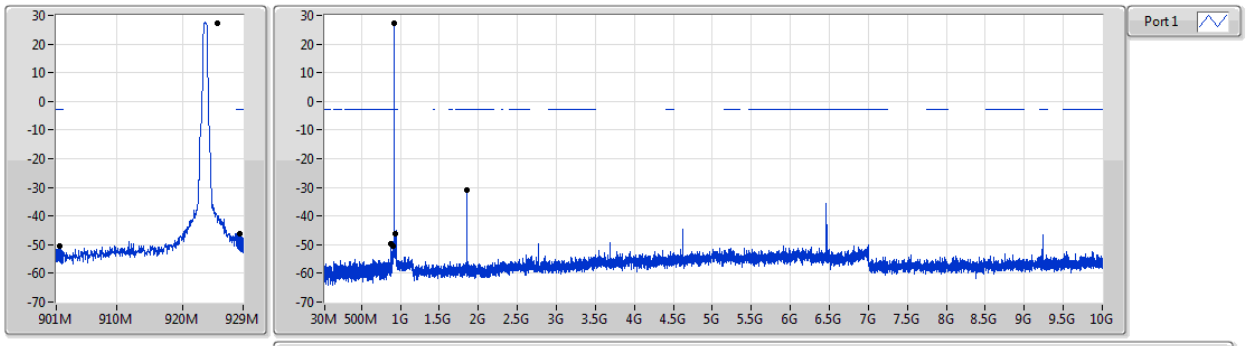
Result

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
LoRa (500kHz)	-	-	-	-	-	-	-	-	-	-	-	-	-
923.3MHz_TnomVnom	Pass	925.14M	27.26	-2.74	871.8215M	-49.57	901.426M	-50.48	928.544M	-46.00	1.846305G	-30.83	1
925.1MHz_TnomVnom	Pass	925.14M	27.26	-2.74	873.128M	-50.98	901.69M	-50.39	928.012M	-42.77	1.849707G	-31.82	1
927.5MHz_TnomVnom	Pass	927.48M	27.67	-2.74	897.0805M	-50.08	901.51M	-50.53	928.002M	-6.86	1.854242G	-24.33	1

LoRa (500kHz) **CSE NdB**

923.3MHz

27/12/2017

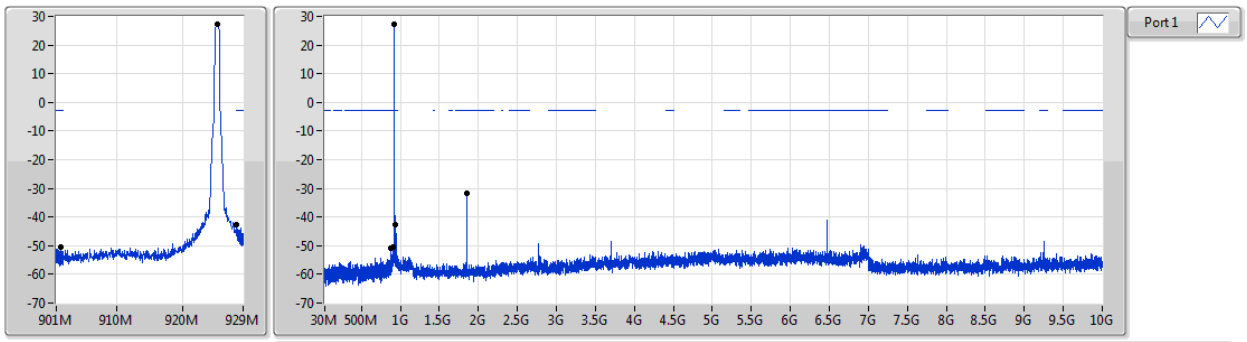


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
925.14M	27.26	-2.74	871.8215M	-49.57	901.426M	-50.48	928.544M	-46.00	1.846305G	-30.83	1

LoRa (500kHz) **CSE NdB**

925.1MHz

27/12/2017

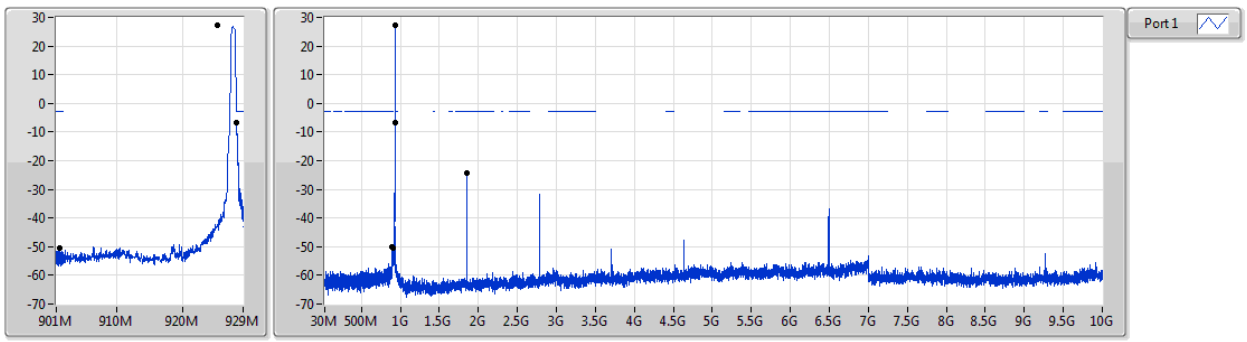


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
925.14M	27.26	-2.74	873.128M	-50.98	901.69M	-50.39	928.012M	-42.77	1.849707G	-31.82	1

LoRa (500kHz) **CSE NdB**

927.5MHz

27/12/2017



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
925.14M	27.26	-2.74	897.0805M	-50.08	901.51M	-50.53	928.002M	-6.86	1.854242G	-24.33	1

Summary

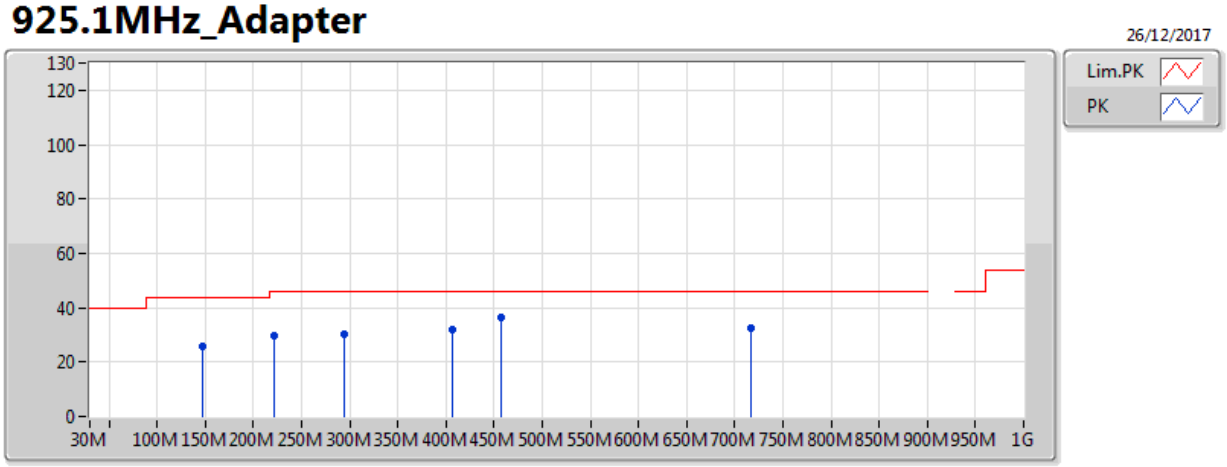
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
902-928MHz	-	-	-	-	-	-	-	-	-	-	-	-
LoRa (500kHz)	Pass	PK	295.78M	41.72	46.00	-4.28	-5.97	3	Horizontal	0	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
LoRa (500kHz)	-	-	-	-	-	-	-	-	-	-	-	-
925.1MHz	Pass	PK	885.54M	35.32	46.00	-10.68	2.69	3	Horizontal	0	1.00	-
925.1MHz	Pass	PK	206.54M	38.29	43.50	-5.21	-10.02	3	Horizontal	0	1.00	-
925.1MHz	Pass	PK	218.18M	41.36	46.00	-4.64	-9.96	3	Horizontal	0	1.00	-
925.1MHz	Pass	PK	295.78M	41.72	46.00	-4.28	-5.97	3	Horizontal	0	1.00	-
925.1MHz	Pass	PK	332.64M	35.32	46.00	-10.68	-5.21	3	Horizontal	0	1.00	-
925.1MHz	Pass	PK	454.86M	38.52	46.00	-7.48	-2.27	3	Horizontal	0	1.00	-
925.1MHz	Pass	PK	146.4M	25.93	43.50	-17.57	-9.33	3	Vertical	360	1.00	-
925.1MHz	Pass	PK	222.06M	29.46	46.00	-16.54	-9.75	3	Vertical	360	1.00	-
925.1MHz	Pass	PK	293.84M	30.38	46.00	-15.62	-6.04	3	Vertical	360	1.00	-
925.1MHz	Pass	PK	406.36M	32.21	46.00	-13.79	-3.10	3	Vertical	360	1.00	-
925.1MHz	Pass	PK	456.8M	36.21	46.00	-9.79	-2.22	3	Vertical	360	1.00	-
925.1MHz	Pass	PK	716.76M	32.54	46.00	-13.46	0.64	3	Vertical	360	1.00	-

LoRa (500kHz)

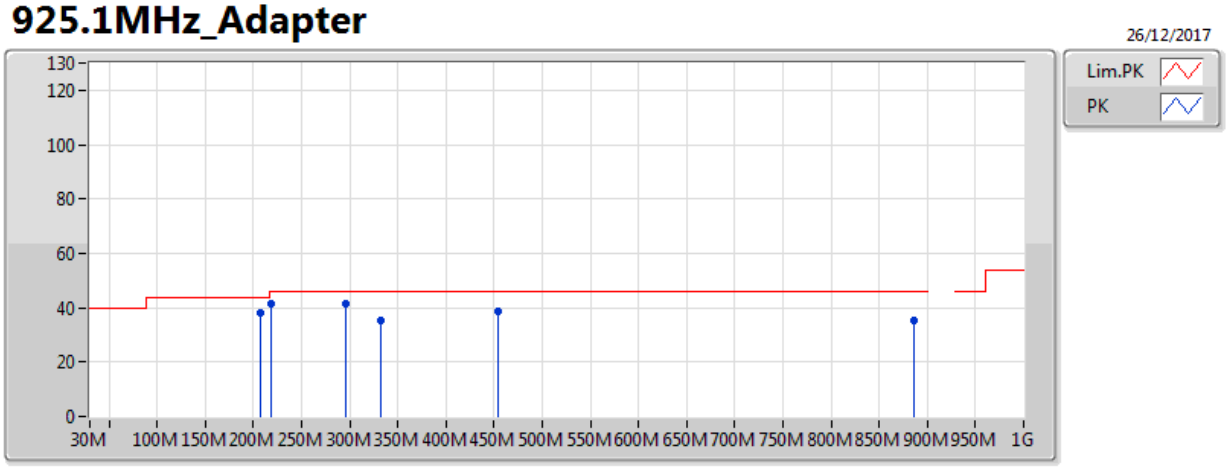
925.1MHz_Adapter



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	146.4M	25.93	43.50	-17.57	-9.33	3	Vertical	360	1.00	-	35.26	15.70	2.13	27.16
PK	222.06M	29.46	46.00	-16.54	-9.75	3	Vertical	360	1.00	-	39.21	14.56	2.55	26.86
PK	293.84M	30.38	46.00	-15.62	-6.04	3	Vertical	360	1.00	-	36.42	18.28	2.38	26.69
PK	406.36M	32.21	46.00	-13.79	-3.10	3	Vertical	360	1.00	-	35.31	21.11	3.10	27.32
PK	456.8M	36.21	46.00	-9.79	-2.22	3	Vertical	360	1.00	-	38.43	21.93	3.44	27.59
PK	716.76M	32.54	46.00	-13.46	0.64	3	Vertical	360	1.00	-	31.90	24.35	4.20	27.92

LoRa (500kHz)

925.1MHz_Adapter



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	206.54M	38.29	43.50	-5.21	-10.02	3	Horizontal	0	1.00	-	48.31	14.32	2.57	26.90
PK	218.18M	41.36	46.00	-4.64	-9.96	3	Horizontal	0	1.00	-	51.32	14.34	2.57	26.87
PK	295.78M	41.72	46.00	-4.28	-5.97	3	Horizontal	0	1.00	-	47.69	18.34	2.38	26.69
PK	332.64M	35.32	46.00	-10.68	-5.21	3	Horizontal	0	1.00	-	40.53	18.89	2.77	26.88
PK	454.86M	38.52	46.00	-7.48	-2.27	3	Horizontal	0	1.00	-	40.79	21.87	3.44	27.58
PK	885.54M	35.32	46.00	-10.68	2.69	3	Horizontal	0	1.00	-	32.63	25.50	4.73	27.53

Summary

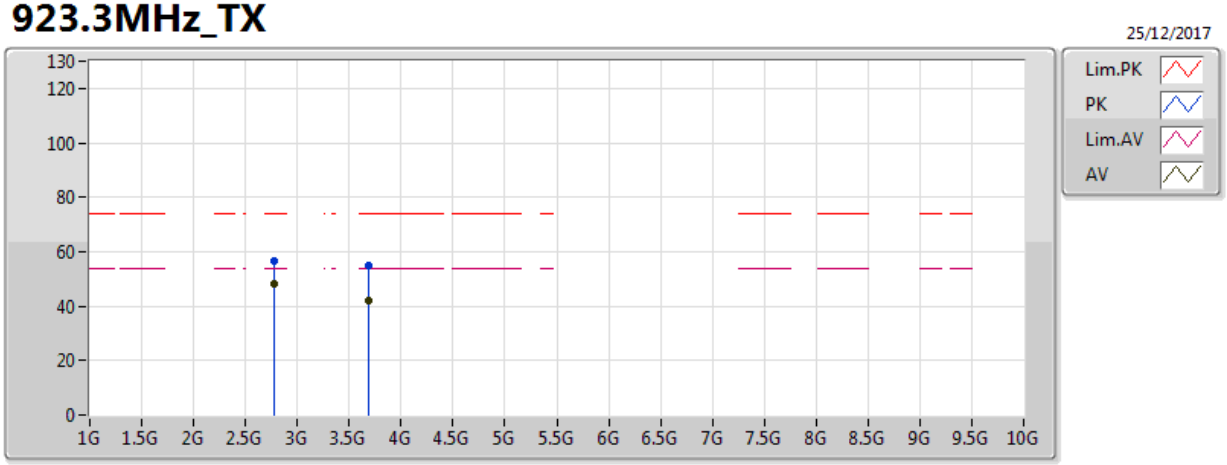
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
902-928MHz	-	-	-	-	-	-	-	-	-	-	-	-
LoRa (500kHz)	Pass	AV	2.78254G	48.37	54.00	-5.63	1.09	3	Horizontal	110	1.02	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
LoRa (500kHz)	-	-	-	-	-	-	-	-	-	-	-	-
923.3MHz	Pass	AV	2.76997G	47.38	54.00	-6.62	1.06	3	Horizontal	113	1.03	-
923.3MHz	Pass	AV	3.6932G	40.27	54.00	-13.73	2.87	3	Horizontal	85	1.23	-
923.3MHz	Pass	PK	2.76979G	56.34	74.00	-17.66	1.06	3	Horizontal	113	1.03	-
923.3MHz	Pass	PK	3.692911G	53.10	74.00	-20.90	2.87	3	Horizontal	85	1.23	-
923.3MHz	Pass	AV	2.76986G	48.08	54.00	-5.92	1.06	3	Vertical	29	1.01	-
923.3MHz	Pass	AV	3.69329G	41.86	54.00	-12.14	2.87	3	Vertical	112	2.31	-
923.3MHz	Pass	PK	2.76981G	56.53	74.00	-17.47	1.06	3	Vertical	29	1.01	-
923.3MHz	Pass	PK	3.69337G	54.67	74.00	-19.33	2.87	3	Vertical	112	2.31	-
925.1MHz	Pass	AV	2.77536G	48.05	54.00	-5.95	1.08	3	Horizontal	113	1.04	-
925.1MHz	Pass	AV	3.70056G	40.26	54.00	-13.74	2.89	3	Horizontal	89	1.24	-
925.1MHz	Pass	PK	2.77528G	56.55	74.00	-17.45	1.08	3	Horizontal	113	1.04	-
925.1MHz	Pass	PK	3.70049G	53.49	74.00	-20.51	2.89	3	Horizontal	89	1.24	-
925.1MHz	Pass	AV	2.77536G	47.19	54.00	-6.81	1.08	3	Vertical	30	1.22	-
925.1MHz	Pass	AV	3.70058G	42.04	54.00	-11.96	2.89	3	Vertical	105	2.23	-
925.1MHz	Pass	PK	2.775779G	56.39	74.00	-17.61	1.08	3	Vertical	30	1.22	-
925.1MHz	Pass	PK	3.7006G	54.09	74.00	-19.91	2.89	3	Vertical	105	2.23	-
927.5MHz	Pass	AV	2.78254G	48.37	54.00	-5.63	1.09	3	Horizontal	110	1.02	-
927.5MHz	Pass	AV	3.71004G	38.48	54.00	-15.52	2.92	3	Horizontal	132	1.27	-
927.5MHz	Pass	PK	2.7827G	54.86	74.00	-19.14	1.10	3	Horizontal	110	1.02	-
927.5MHz	Pass	PK	3.709721G	49.16	74.00	-24.84	2.92	3	Horizontal	132	1.27	-
927.5MHz	Pass	AV	2.7825G	47.65	54.00	-6.35	1.09	3	Vertical	138	1.01	-
927.5MHz	Pass	AV	3.71004G	38.92	54.00	-15.08	2.92	3	Vertical	113	1.13	-
927.5MHz	Pass	PK	2.7825G	53.78	74.00	-20.22	1.09	3	Vertical	138	1.01	-
927.5MHz	Pass	PK	3.710359G	49.80	74.00	-24.20	2.92	3	Vertical	113	1.13	-

LoRa (500kHz)

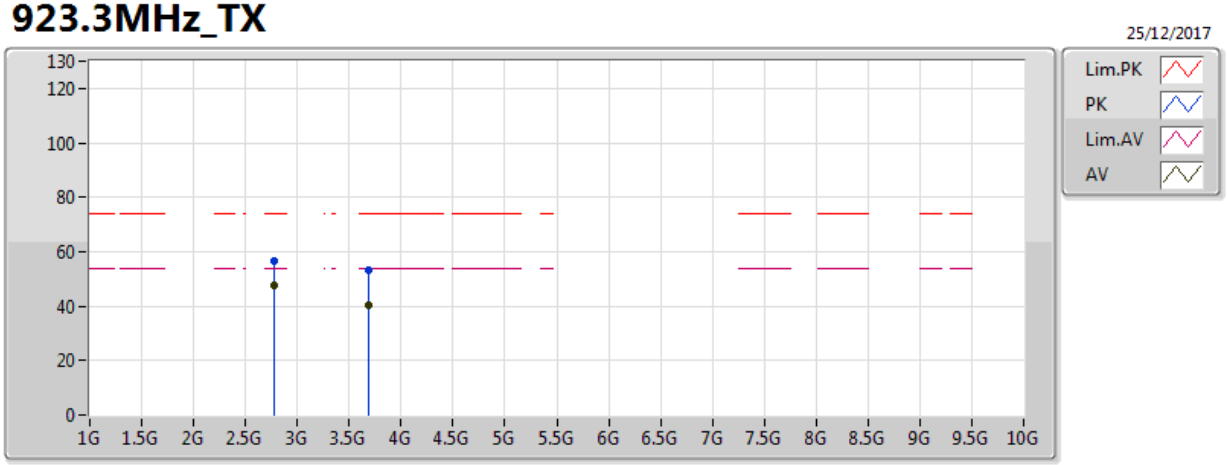
923.3MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.76986G	48.08	54.00	-5.92	1.06	3	Vertical	29	1.01	-	47.02	27.99	3.49	30.42
AV	3.69329G	41.86	54.00	-12.14	2.87	3	Vertical	112	2.31	-	38.99	28.93	4.08	30.13
PK	2.76981G	56.53	74.00	-17.47	1.06	3	Vertical	29	1.01	-	55.47	27.99	3.49	30.42
PK	3.69337G	54.67	74.00	-19.33	2.87	3	Vertical	112	2.31	-	51.80	28.93	4.08	30.13

LoRa (500kHz)

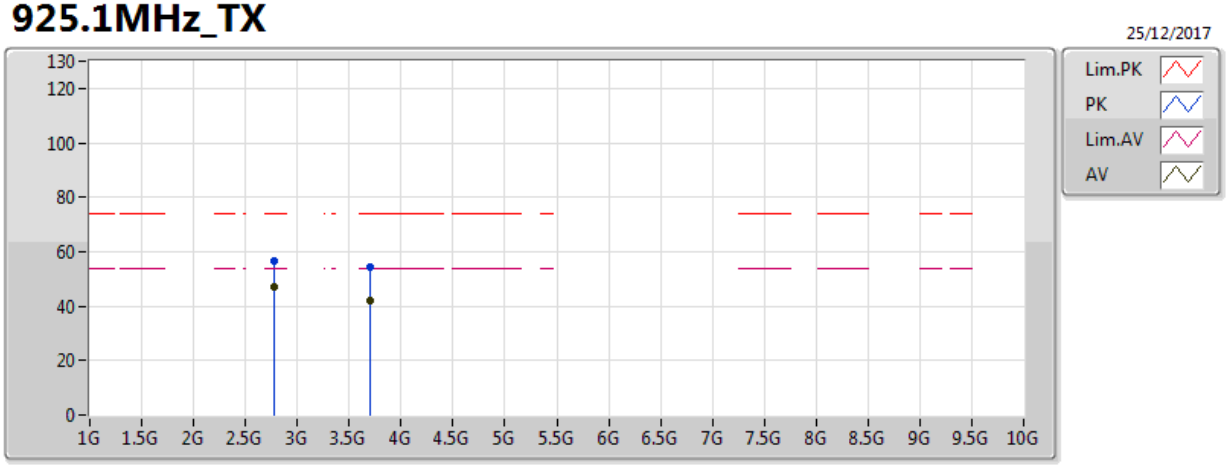
923.3MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.76997G	47.38	54.00	-6.62	1.06	3	Horizontal	113	1.03	-	46.32	27.99	3.49	30.42
AV	3.6932G	40.27	54.00	-13.73	2.87	3	Horizontal	85	1.23	-	37.40	28.93	4.08	30.13
PK	2.76979G	56.34	74.00	-17.66	1.06	3	Horizontal	113	1.03	-	55.28	27.99	3.49	30.42
PK	3.692911G	53.10	74.00	-20.90	2.87	3	Horizontal	85	1.23	-	50.23	28.92	4.08	30.13

LoRa (500kHz)

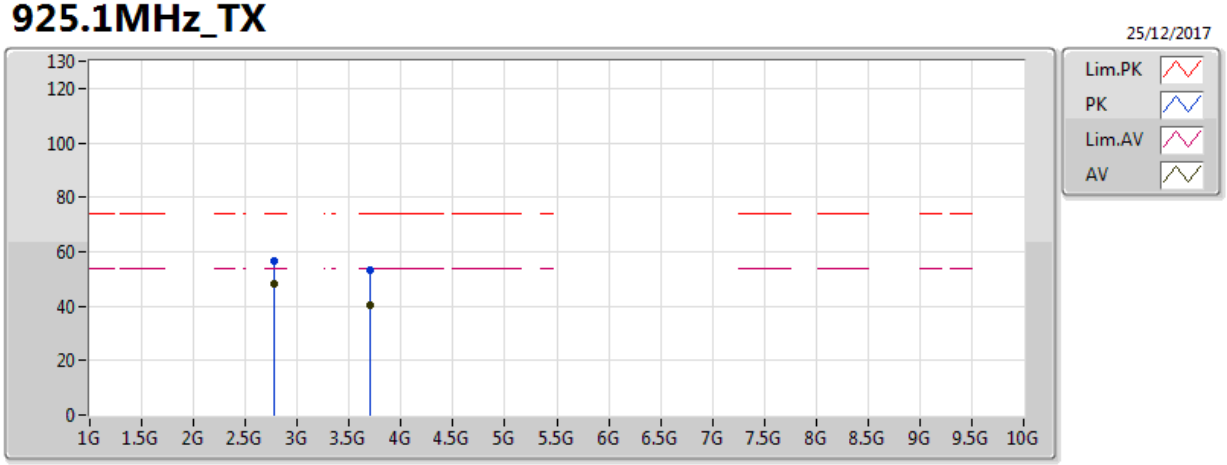
925.1MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.77536G	47.19	54.00	-6.81	1.08	3	Vertical	30	1.22	-	46.11	28.00	3.50	30.41
AV	3.70058G	42.04	54.00	-11.96	2.89	3	Vertical	105	2.23	-	39.15	28.94	4.08	30.13
PK	2.775779G	56.39	74.00	-17.61	1.08	3	Vertical	30	1.22	-	55.31	28.00	3.50	30.41
PK	3.7006G	54.09	74.00	-19.91	2.89	3	Vertical	105	2.23	-	51.20	28.94	4.08	30.13

LoRa (500kHz)

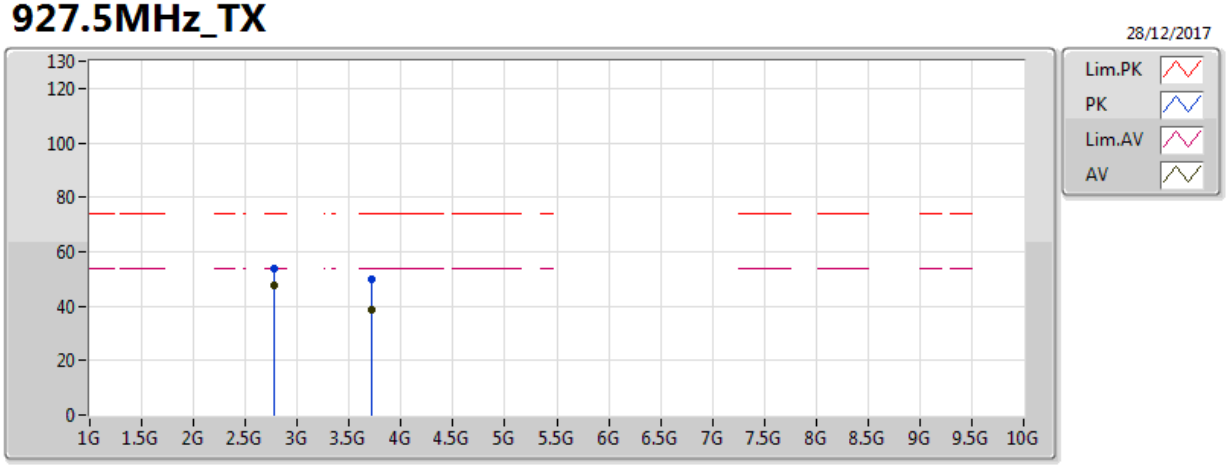
925.1MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.77536G	48.05	54.00	-5.95	1.08	3	Horizontal	113	1.04	-	46.97	28.00	3.50	30.41
AV	3.70056G	40.26	54.00	-13.74	2.89	3	Horizontal	89	1.24	-	37.37	28.94	4.08	30.13
PK	2.77528G	56.55	74.00	-17.45	1.08	3	Horizontal	113	1.04	-	55.47	28.00	3.50	30.41
PK	3.70049G	53.49	74.00	-20.51	2.89	3	Horizontal	89	1.24	-	50.60	28.94	4.08	30.13

LoRa (500kHz)

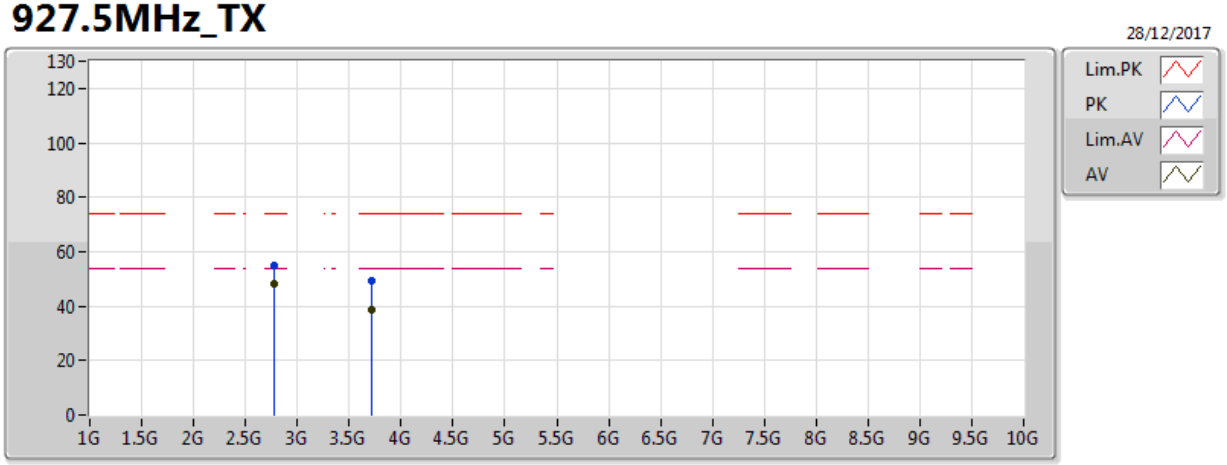
927.5MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.7825G	47.65	54.00	-6.35	1.09	3	Vertical	138	1.01	-	46.55	28.01	3.50	30.41
AV	3.71004G	38.92	54.00	-15.08	2.92	3	Vertical	113	1.13	-	36.00	28.96	4.09	30.13
PK	2.7825G	53.78	74.00	-20.22	1.09	3	Vertical	138	1.01	-	52.69	28.01	3.50	30.41
PK	3.710359G	49.80	74.00	-24.20	2.92	3	Vertical	113	1.13	-	46.88	28.96	4.09	30.13

LoRa (500kHz)

927.5MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.78254G	48.37	54.00	-5.63	1.09	3	Horizontal	110	1.02	-	47.27	28.01	3.50	30.41
AV	3.71004G	38.48	54.00	-15.52	2.92	3	Horizontal	132	1.27	-	35.56	28.96	4.09	30.13
PK	2.7827G	54.86	74.00	-19.14	1.10	3	Horizontal	110	1.02	-	53.77	28.01	3.50	30.41
PK	3.709721G	49.16	74.00	-24.84	2.92	3	Horizontal	132	1.27	-	46.24	28.96	4.09	30.13