

<b>Prüfbericht - Nr.:</b> <i>Test Report No.:</i>	<b>50361124 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	180123644	Seite 1 von 72 <i>Page 1 of 72</i>
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2020.03.05	
<b>Auftraggeber:</b> <i>Client:</i>	Ring LLC 1523 26th St, Santa Monica, CA 90404, USA			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Motion Sensor			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	5SM1S8			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	TÜV Rheinland – FCC/IC Service			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 15: Subpart C Section 15.247 RSS-247 Issue 2 February 2017 RSS-Gen Issue 5 March 2019			
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	2020.03.05			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A001076653 002			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2020.03.23-2020.04.12			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Refer to section 1.1.			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>		
2020.10.12 Caidong Xie/PE <i>Caidong Xie</i>		2020.10.12 Feng Liang/TC <i>Feng Liang</i>		
<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>
				<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges/ Other:</b> Refer to the test report 50361125 001 for the conformance of Radio Frequency Exposure requirement. Refer to page 5 to 6 for more information.				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
*Legende:	1= Sehr gut	2 = gut	3= befriedigend	4= ausreichend
	P(ass) =entspricht o.g. Prüfgrundlage(n)	F(ail)= entspricht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	5 = mangelhaft
Legend:	1= very good	2 = good	3= satisfactory	4= sufficient
	P(ass) = passed a.m. test specification(s)	F(ail)= failed a.m. test specification(s)	N/A = not applicable	5 = poor
				N/T = nicht getestet
				N/T = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>				

V04

## TEST SUMMARY

4.1.1 ANTENNA REQUIREMENT

Result:

Pass

4.1.2 6dB AND 20dB BANDWIDTH MEASUREMENT

Result:

Pass

4.1.3 99% EMISSION BANDWIDTH MEASUREMENT

Result:

Pass

4.1.4 MAXIMUM PEAK CONDUCTED OUTPUT POWER

Result:

Pass

4.1.5 EQUIVALENT ISOTROPICALLY RADIATED POWER

Result:

Pass

4.1.6 PEAK POWER SPECTRAL DENSITY

Result:

Pass

4.1.7 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH

Result:

Pass

4.1.8 CARRIER SEPARATION MEASUREMENT

Result:

Pass

4.1.9 THE NUMBER OF HOPPING CHANNELS

Result:

Pass

4.1.10 CHANNEL OCCUPANCY TIME

Result:

Pass

4.1.11 CONDUCTED EMISSION (AC POWER-LINE)

Result:

N.A

4.1.12 RADIATED EMISSION

Result:

Pass

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# 1 Test Sites

## 1.1 Test Facilities

Laboratory: TÜV Rheinland /CCIC(Ningbo) Co., Ltd.

**1<sup>st</sup> Floor, Building 11, Scholar Innovation Park, No.1188 Zhongguan Road, Zhenhai District, Ningbo 315200 P.R. China.**

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

## 1.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

No.	Equipment	Model	Inventory no.	Last cal. date	Cal. due date
1.	EMI test receiver	ESR7	101929	2019.11.26	2020.11.25
2.	Spectrum analyzer	FSV40	101412	2019.11.26	2020.11.25
3.	Pre-amplifier	SCU-18F	180051	2019.11.26	2020.11.25
4.	Horn antenna	HF907	102653	2017.08.03	2020.08.02
5.	Bilog Antenna	CBL6112D	49033	2018.04.13	2021.04.12

## 1.3 Measurement Uncertainty

Test Item	Expanded Measurement Uncertainty (k=2)
Conducted Emission (9-150kHz)	3.70dB
Conducted Emission (150k-30MHz)	3.30dB
Radiated Emission (30-1000MHz)	4.52dB
Radiated Emission (1-18GHz)	4.37dB

## 2 General Product Information

### 2.1 Product Function and Intended Use

The EUT(equipment under test) is a Motion Sensor which support Bluetooth, LoRa DTS, LoRa FHSS and FSK HFSS function operated at 2400-2483.5MHz and 902-928MHz respectively. For the further information, refer to the user's manual.

**Model list:**

Model name	Function
5SM1S8	Block A: BLE operated at 2.4GHz Block B: LoRa DTS, LoRa FHSS and FSK FHSS operated at 902-928MHz

### 2.2 Ratings and System Details

Rated input	: DC 4.5V 3AAA Cells
Protection Class	: Class III
FCC ID	: 2AEUPBHAMS001
IC	: 20271-BHAMS001
HVIN	: 5SM1S8
FVIN	: 1.7.16-56
PMN	: Motion Sensor

#### Technical Specification of BLE

Technical Specification	BLE
Operating Frequency band	2402 – 2480 MHz
Bluetooth Core Version	Bluetooth Low Energy 4.2
Channel separation	2MHz
Extreme Temperature Range	-20°C ~ 50°C
Modulation	GFSK
Antenna Type	PCB Layout Antenna
Antenna Gain(dBi)	3.26
Channel	0~39

#### Technical Specification of LoRa DTS

Technical Specification	LoRa DTS 500kHz 902.5-926.5MHz
Operating Frequency band	902 – 928 MHz
Extreme Temperature Range	-20°C ~ 50°C
Bandwidth(kHz)	500
Modulation	LoRa DTS
Antenna Type	LTCC Antenna
Antenna Gain(dBi)	1.1
Channel Separation (kHz)	800
Channel Number	31
Channel (MHz)	902.5, 903.3, 904.1, 904.9, 905.7, 906.5, 907.3, 908.1, 908.9, 909.7, 910.5, 911.3, 912.1, 912.9, 913.7, 914.5, 915.3, 916.1, 916.9, 917.7, 918.5, 919.3, 920.1, 920.9, 921.7, 922.5, 923.3, 924.1, 924.9, 925.7, 926.5

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#### Technical Specification of LoRa FHSS

Technical Specification	LoRa 125kHz FHSS 902.2-927.8MHz
Operating Frequency band	902 – 928 MHz
Extreme Temperature Range	-20°C ~ 50°C
Modulation	LoRa FHSS
Antenna Type	LTCC Antenna
Antenna Gain(dBi)	1.1
Channel Separation (kHz)	200
Channel Number	129
Bandwidth (kHz)	125
Hopping channel(MHz)	902.2-927.8

#### Technical Specification of FSK FHSS

Technical Specification	FSK150Kbps FHSS	FSK 50Kbps FHSS	FSK 250Kbps FHSS
Operating Frequency band	902 – 928 MHz		
Extreme Temperature Range	-20°C ~ 50°C		
Modulation	FSK FHSS		
Antenna Type	LTCC Antenna		
Antenna Gain(dBi)	1.1		
Channel Separation (kHz)	400	200	500
Channel Number	64	129	51
Data Rate (Kbps)	150	50	250
Hopping Channel(MHz)	902.4~927.6	902.2~927.8	902.5~927.5

## 2.3 Independent Operation Modes

The basic operation modes are:

Mode A: Transmitting continuously in a channel

Mode B: Hopping in a sequence of hopping channels and Transmitting

Mode C: Transmitting continuously or Receiving continuously in a channel, the worst case recorded

## 2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit diagram for further information.

## 2.5 Submitted Documents

Circuit diagram, PCB layout, Labels, user's manual, etc.

### 3 Test Set-up and Operation Modes

#### 3.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The Mode Cs were adapted accordingly in reference to the instructions for use.

#### 3.2 Test Operation and Test Software

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power was selected according to the instruction given by the manufacturer. The setting of the RF output power expected by the customer shall be fixed on the firmware of the final end product.

All testing were performed according to the procedures in ANSI C63.10: 2013.

Test Software EMC32 V10.30 was used in the radiated emission test.

#### 3.3 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.
notebook	Lenovo	T420

#### 3.4 Countermeasures to achieve EMC Compliance

The tested sample contained noise suppression components as specified in the circuit diagram. No special measure is employed to achieve the requirement.

### 3.5 Test set-up

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

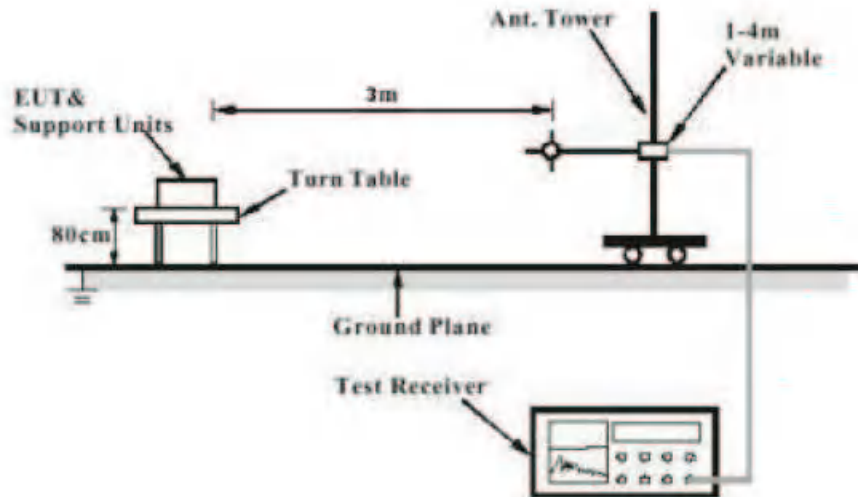


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

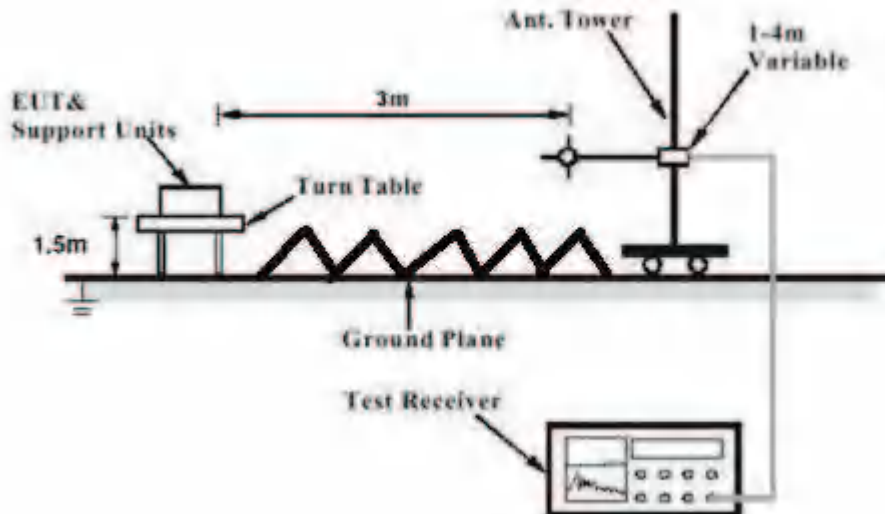
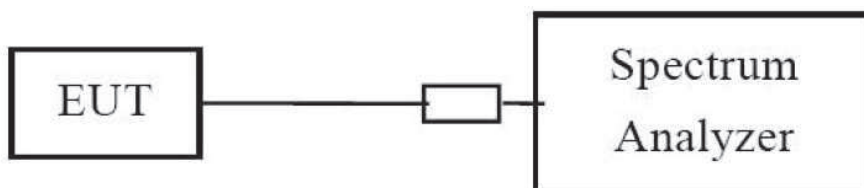


Diagram of Measurement Configuration for Conducted Transmitter Measurement





## 4 Test Results

### 4.1 Transmitter Requirement & Test Suites

#### 4.1.1 Antenna Requirement

**Result:**

Pass

Test Specification  
Test standard : FCC Part 15.203

The EUT has two internal antennas, which permanently attached and no consideration of replacement. Therefore, the EUT is considered sufficient to comply with the provision. Refer to EUT Photo for further details.

### 4.1.2 6dB and 20dB Bandwidth Measurement

**Result:**

**Pass**

Test Specification

Test standard : FCC Part 15.247(a)(1)(i), (a)(2)  
RSS-247 Issue 2 February 2017 Clause 5.1, Clause 5.2

Basic standard : ANSI C63.10: 2013, clause 6.9.2  
KDB558074 D01v05r02, clause 8.3.1.1

Limits : At least 500kHz for 6dB bandwidth(DTS)  
Not more than 500kHz for 20dB bandwidth(FHSS)

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 27.03.2020-12.04.2020

Input voltage : DC 4.5V

Operational mode : Mode A

Test channel : Lo, Mi, Hi

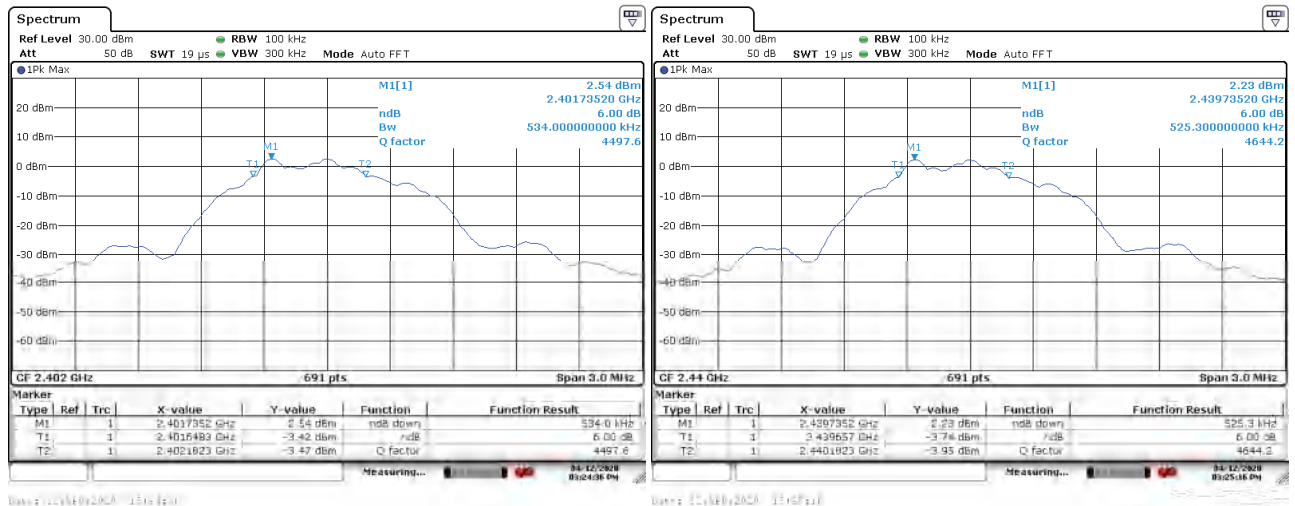
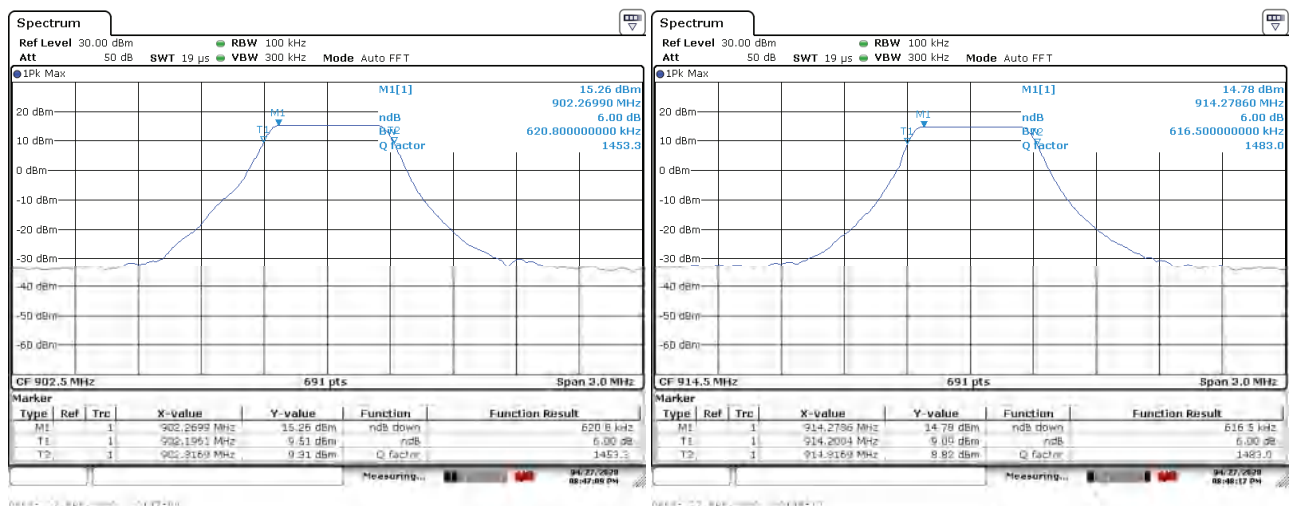
Temperature : 23°C

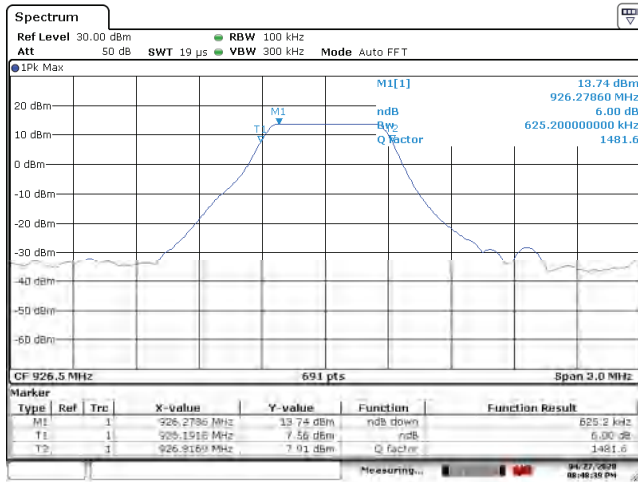
Relative humidity : 51%

Atmospheric pressure : 101 kPa

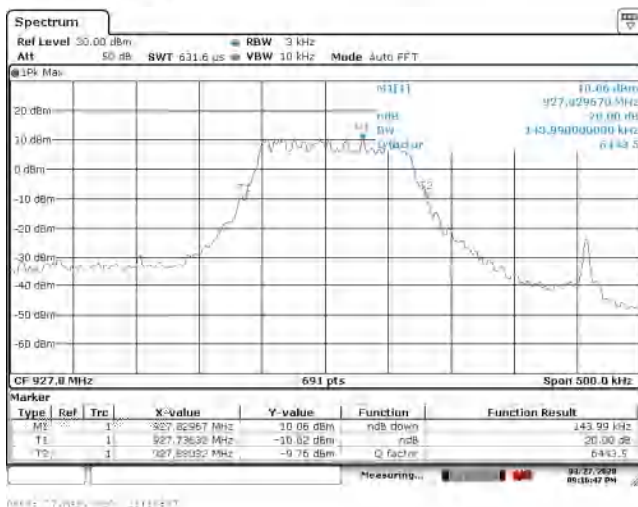
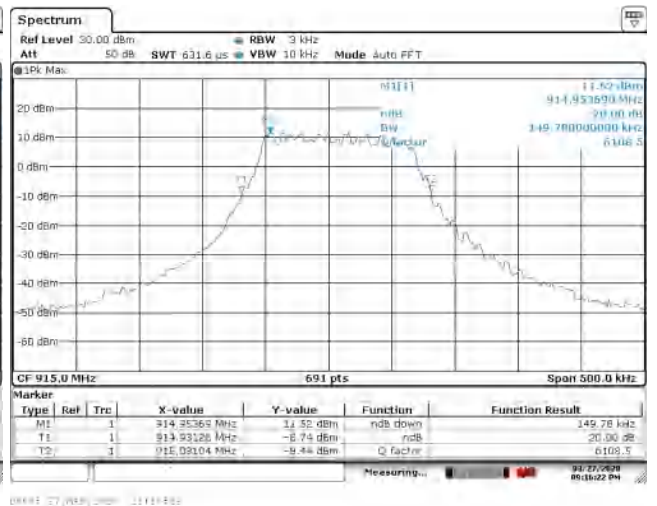
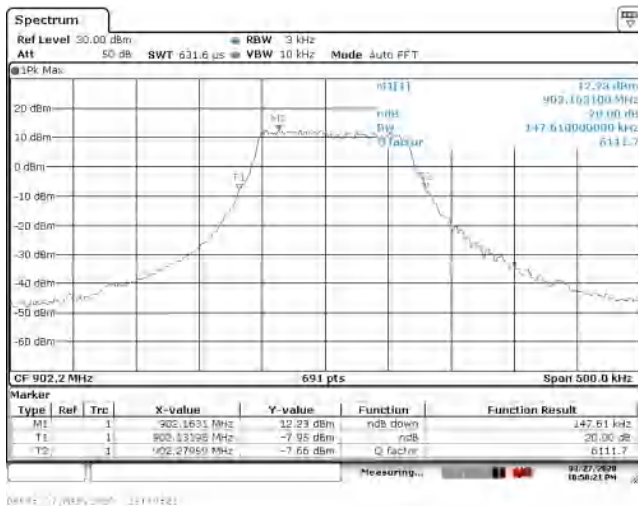
**Table 2: Test result of 6dB Bandwidth for BLE and LoRa DTS, 20dB Bandwidth for LoRa FHSS and FSK FHSS**

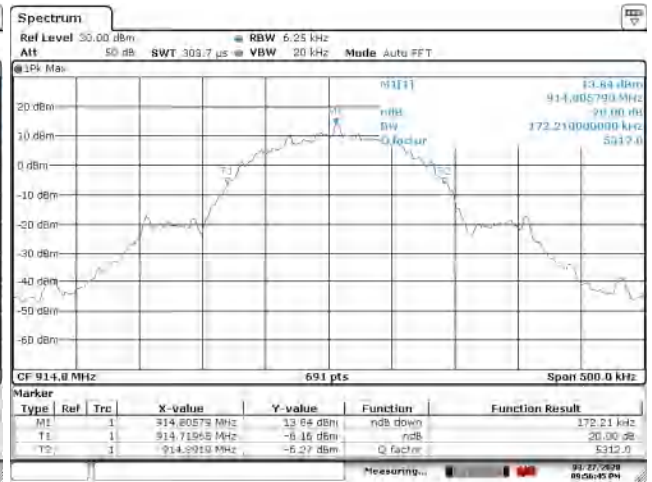
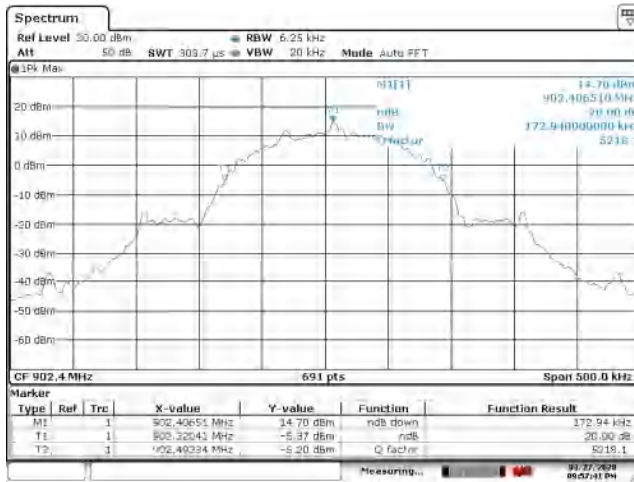
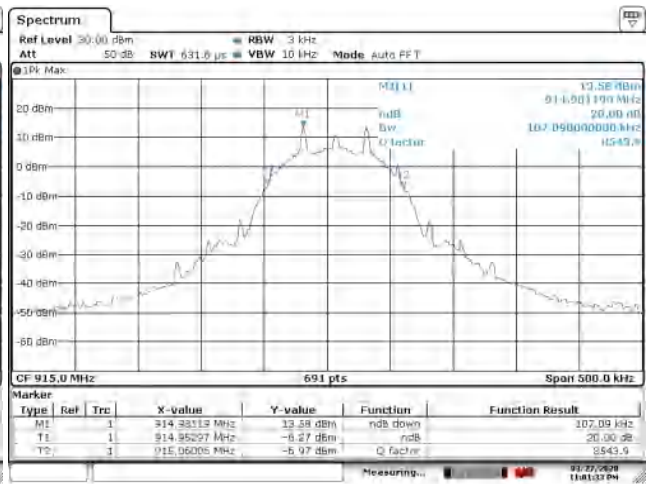
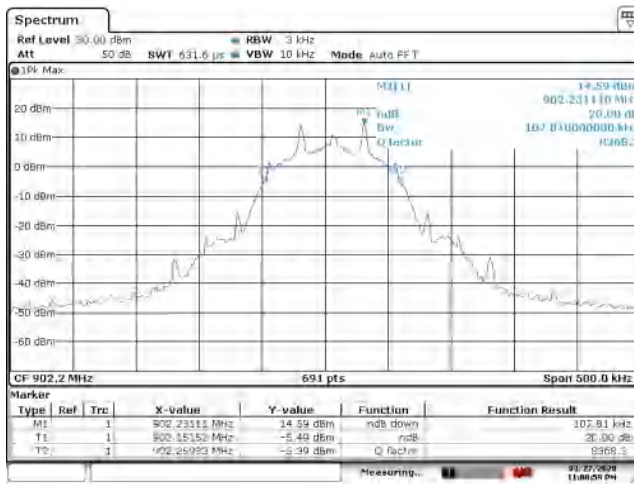
Modulation Type and Operation band	Channel	Channel Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
1. BLE 2402MHz~2480MHz 6dB Bandwidth	Low Channel	2402	534.00	500	Pass
	Mid Channel	2440	525.30	500	Pass
	High Channel	2480	529.70	500	Pass
2. LoRa 500kHz DTS 902.5MHz~926.5MHz 6dB Bandwidth	Low Channel	902.5	620.80	500	Pass
	Mid Channel	914.5	616.50	500	Pass
	High Channel	926.5	625.20	500	Pass
3. LoRa 125kHz FHSS 902.2-927.8MHz 20dB Bandwidth	Low Channel	902.2	147.61	500	Pass
	Mid Channel	915	149.78	500	Pass
	High Channel	927.8	143.99	500	Pass
4. FSK 150Kbps FHSS 902.4MHz~927.6MHz 20dB Bandwidth	Low Channel	902.4	172.94	500	Pass
	Mid Channel	914.8	172.21	500	Pass
	High Channel	927.6	172.21	500	Pass
5. FSK 50Kbps FHSS 902.2MHz~927.8MHz 20dB Bandwidth	Low Channel	902.2	107.81	500	Pass
	Mid Channel	915	107.09	500	Pass
	High Channel	927.8	109.26	500	Pass
6. FSK 250Kbps FHSS 902.5MHz~927.5MHz 20dB Bandwidth	Low Channel	902.5	296.70	500	Pass
	Mid Channel	915	288.00	500	Pass
	High Channel	927.5	290.90	500	Pass

**Figure 1: 6dB&20dB Bandwidth Measurement**
**1. BLE, 6dB Bandwidth, 2402MHz~2480MHz**

**2. LoRa 500kHz DTS, 6dB Bandwidth, 902.5MHz~926.5MHz**


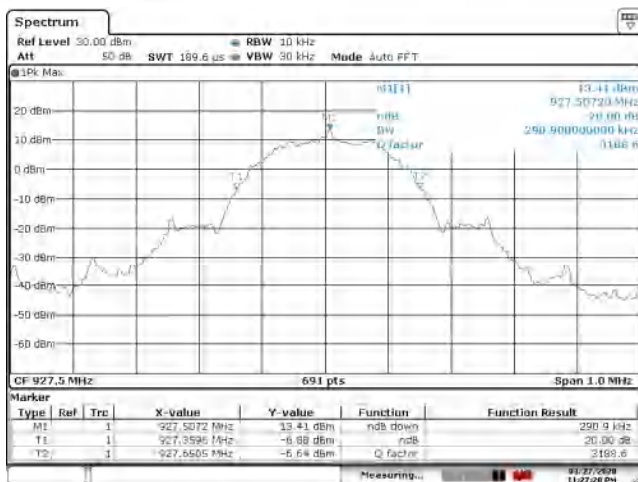
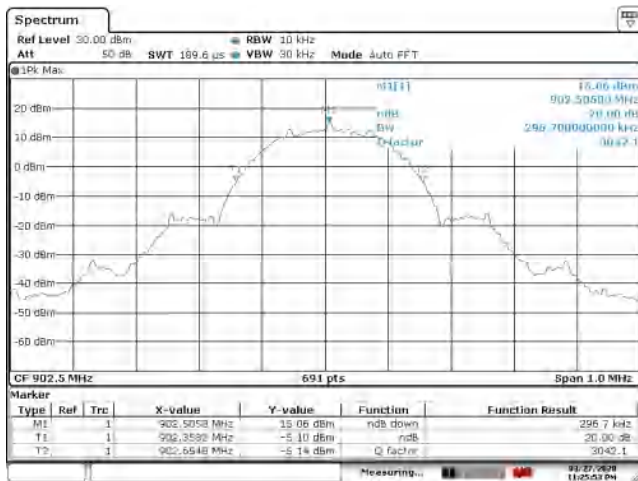


### 3. LoRa 125kHz FHSS, 20dB Bandwidth, 902.2-927.8MHz



**4. FSK 150Kbps FHSS, 20dB Bandwidth, 902.4MHz~927.6MHz**

**5. FSK 50Kbps FHSS, 20dB Bandwidth, 902.2MHz~927.8MHz**





**6. FSK 250Kbps FHSS, 20dB Bandwidth, 902.5MHz~927.5MHz**


### 4.1.3 99% Emission Bandwidth Measurement

**Result:**

**Pass**

Test Specification

Test standard : RSS Gen Issue 5 March 2019, clause 6.7

Basic standard : ANSI C63.10: 2013, clause 6.9.3

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 27.03.2020-12.04.2020

Input voltage : DC 4.5V

Operational mode : Mode A

Test channel : Lo, Mi, Hi

Temperature : 23°C

Relative humidity : 51%

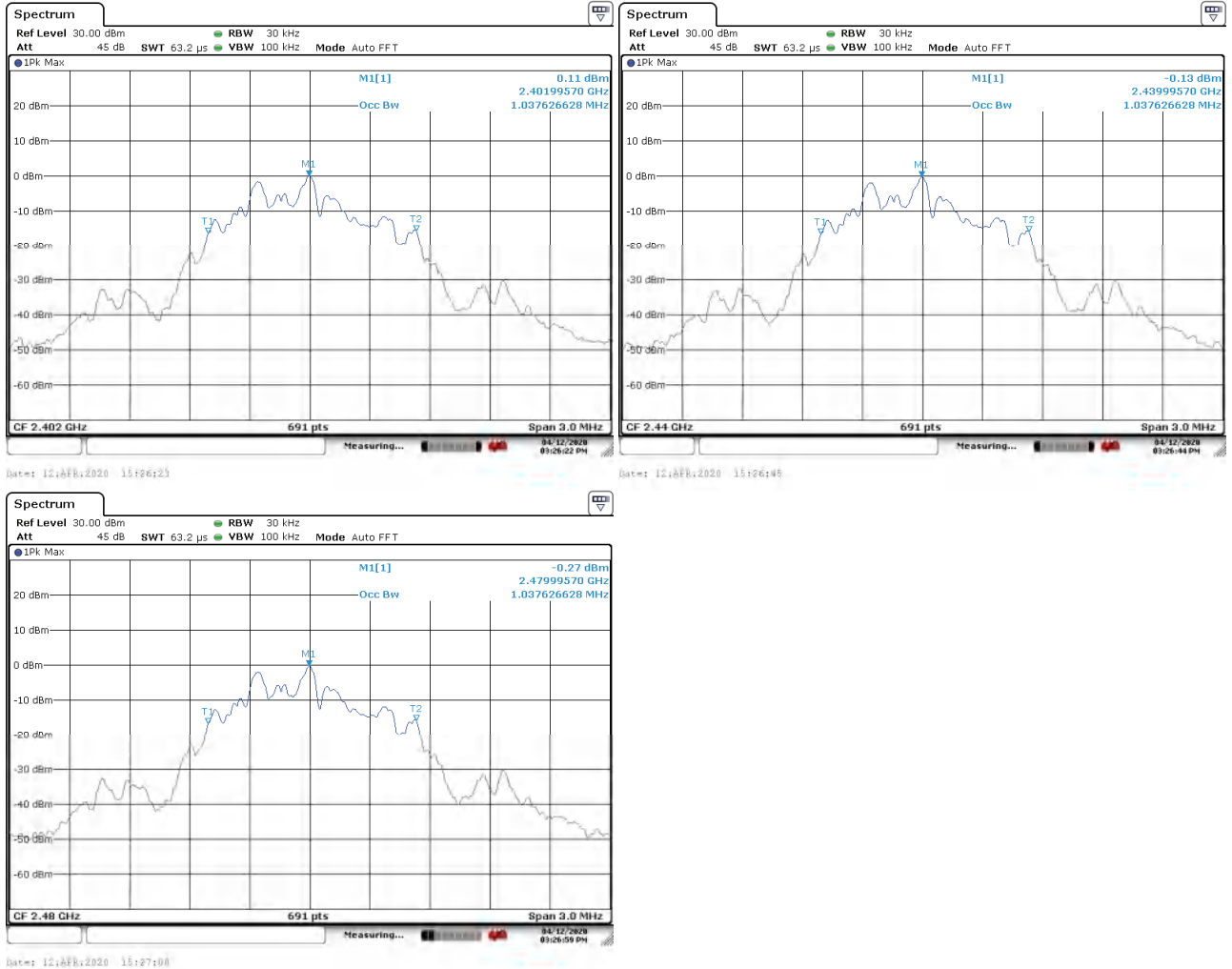
Atmospheric pressure : 101 kPa

**Table 3 Test result of 99% Emission Bandwidth for BLE, LoRa DTS, LoRa FHSS and FSK FHSS**

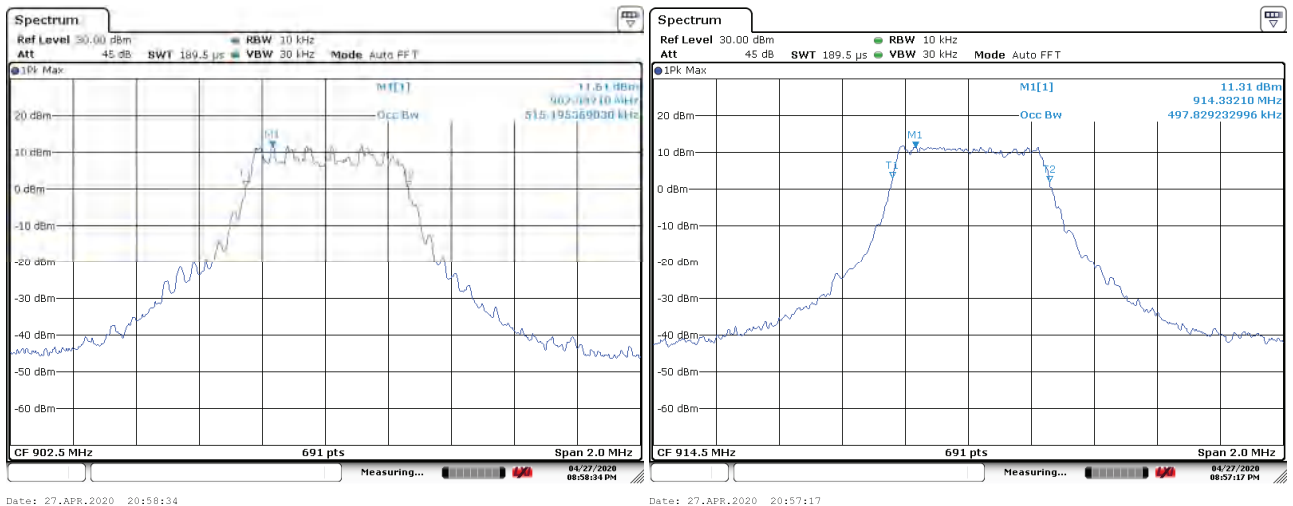
Modulation Type and Operation band	Channel	Channel Frequency (MHz)	Bandwidth (kHz)
1. BLE 2402MHz~2480MHz 99% Emission Bandwidth	Low Channel	2402	1037.63
	Mid Channel	2440	1037.63
	High Channel	2480	1037.63
2. LoRa 500kHz DTS 902.5MHz~926.5MHz 99% Emission Bandwidth	Low Channel	902.5	515.20
	Mid Channel	914.5	497.83
	High Channel	926.5	515.20
3. LoRa 125kHz FHSS 902.2MHz~927.8MHz 99% Emission Bandwidth	Low Channel	902.2	125.90
	Mid Channel	915	127.35
	High Channel	927.8	125.90
4. FSK 150Kbps FHSS 902.4MHz~927.6MHz 99% Emission Bandwidth	Low Channel	902.4	156.30
	Mid Channel	914.8	156.30
	High Channel	927.6	157.02
5. FSK 50Kbps FHSS 902.2MHz~927.8MHz 99% Emission Bandwidth	Low Channel	902.2	104.20
	Mid Channel	915	102.75
	High Channel	927.8	103.47
6. FSK 250Kbps FHSS 902.5MHz~927.5MHz 99% Emission Bandwidth	Low Channel	902.5	263.39
	Mid Channel	915	261.94
	High Channel	927.5	266.28

Figure 2: 99% Emission Bandwidth Measurement

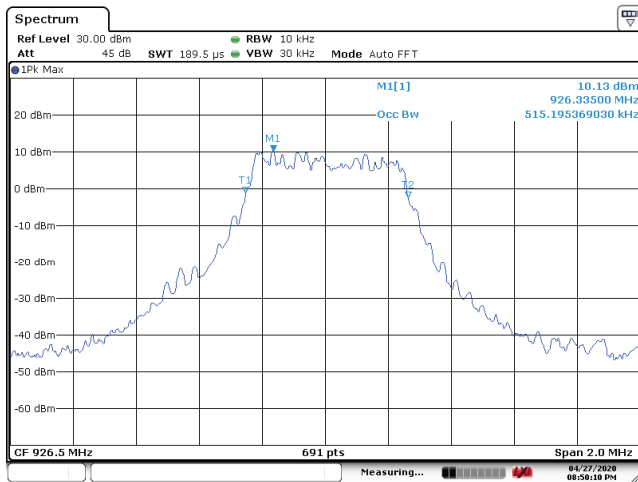
1. BLE, 99% Emission Bandwidth, 2402MHz~2480MHz



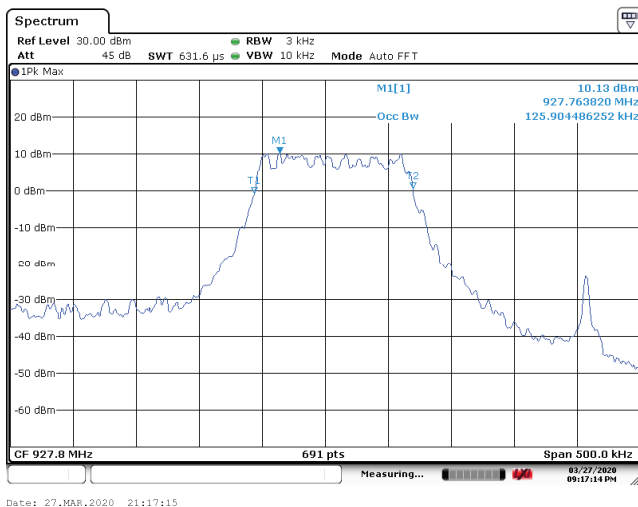
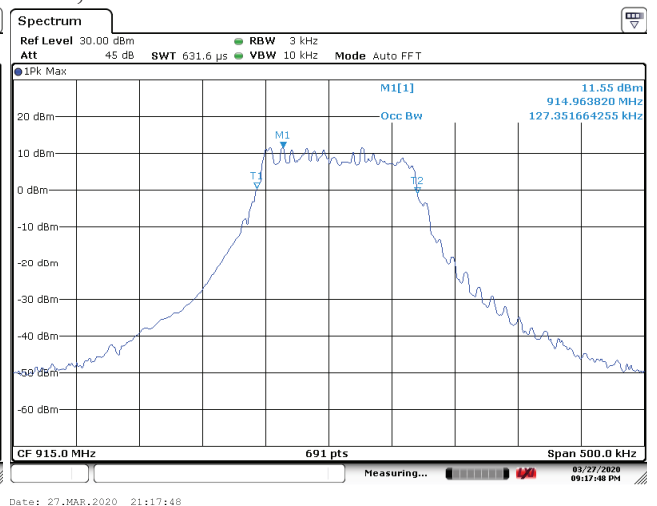
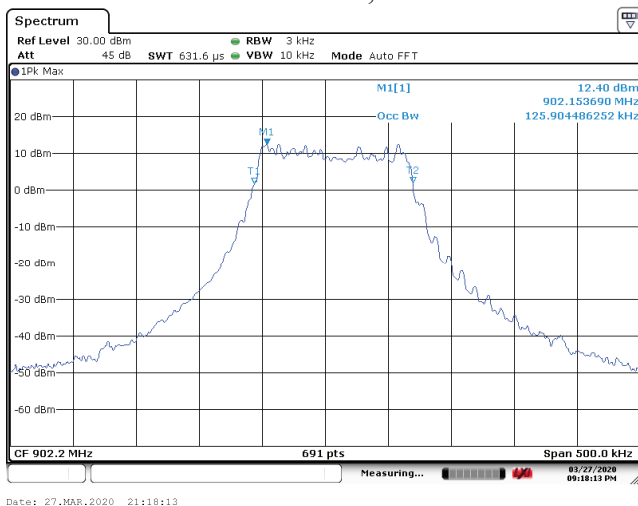
2. LoRa 500kHz DTS, 99% Emission Bandwidth, 902.5MHz~926.5MHz

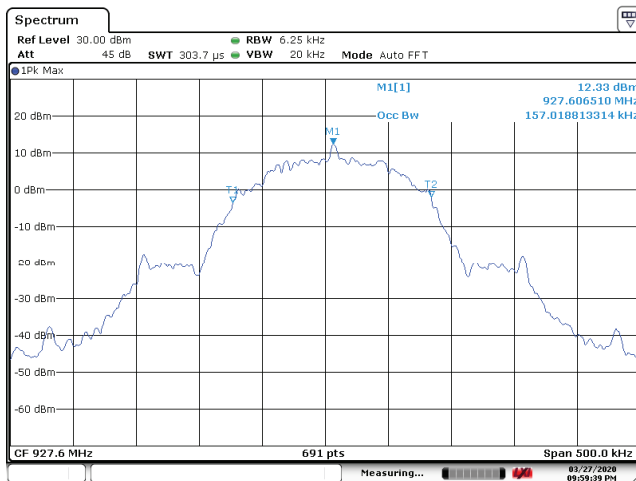
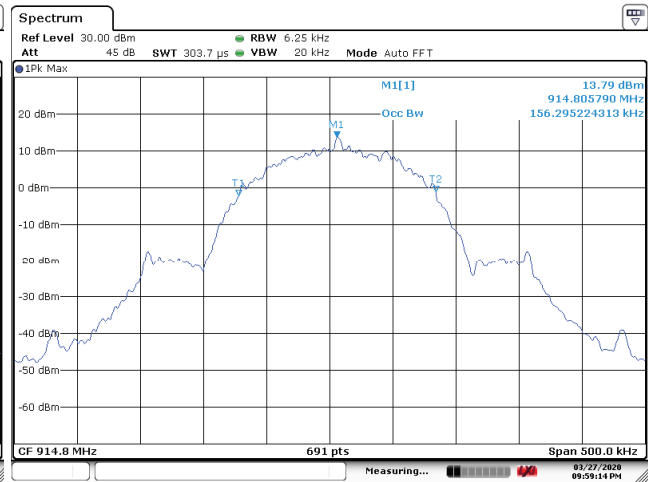
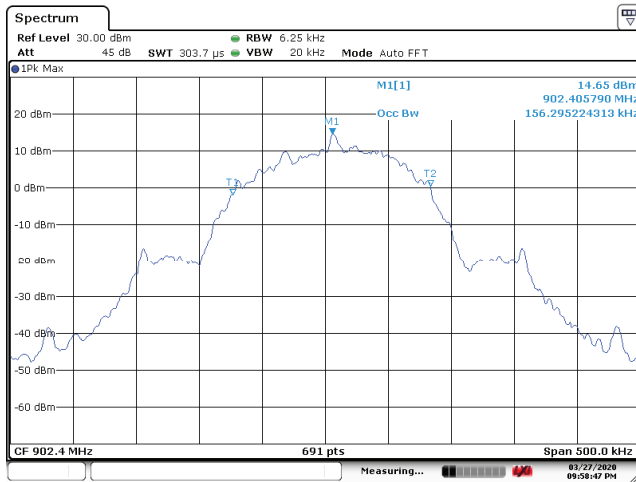
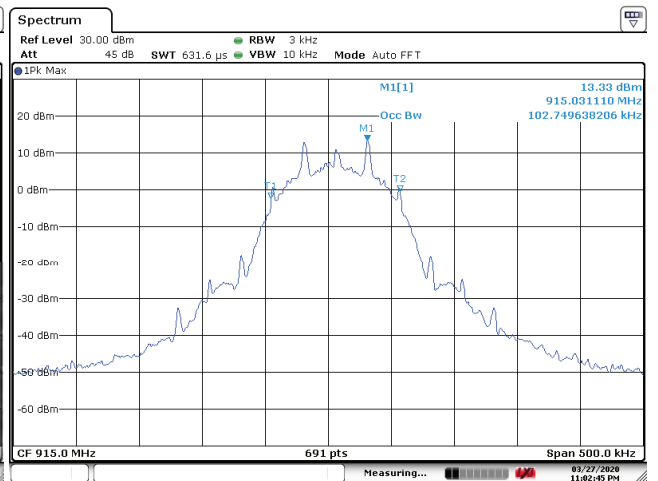
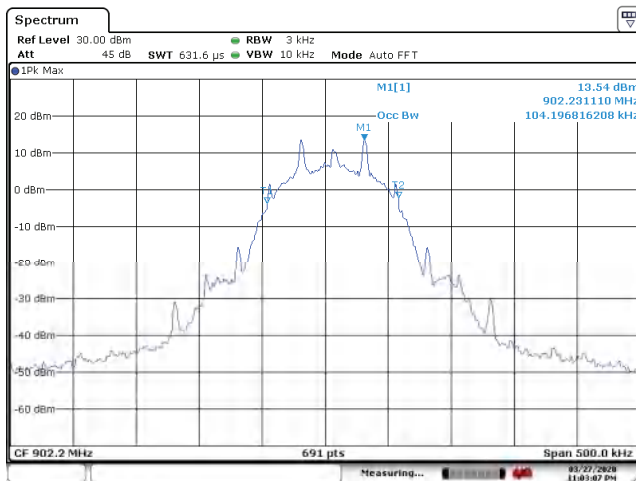


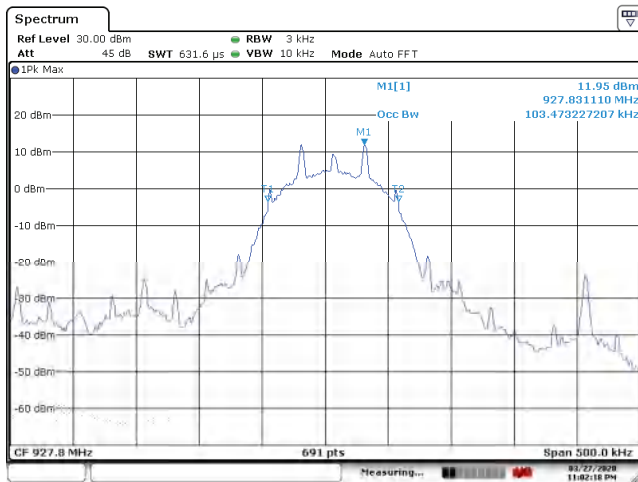




### 3. LoRa 125kHz FHSS, 99% Emission Bandwidth, 902.2MHz~927.8MHz

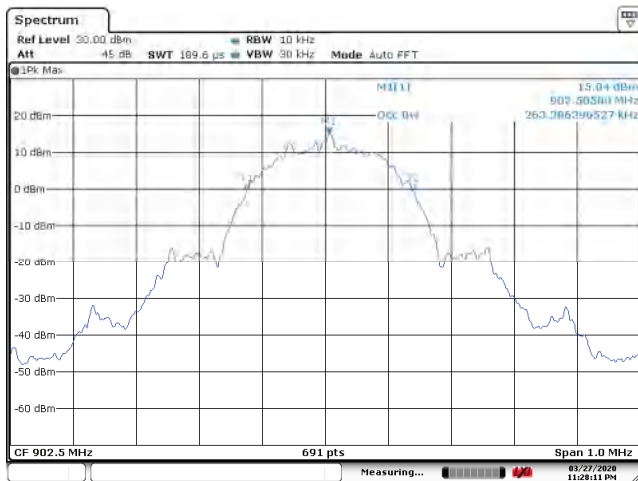


**4. FSK 150Kbps FHSS, 99% Emission Bandwidth, 902.4MHz~927.6MHz**

**5. FSK 50Kbps FHSS, 99% Emission Bandwidth, 902.2MHz~927.8MHz**


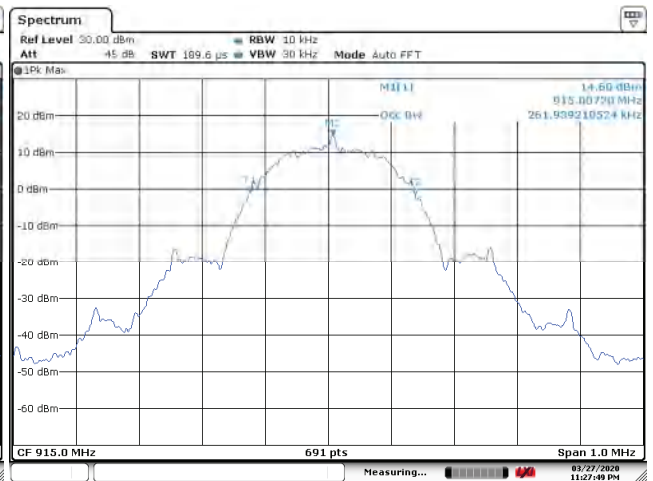


Date: 27.MAR.2020 23:02:19

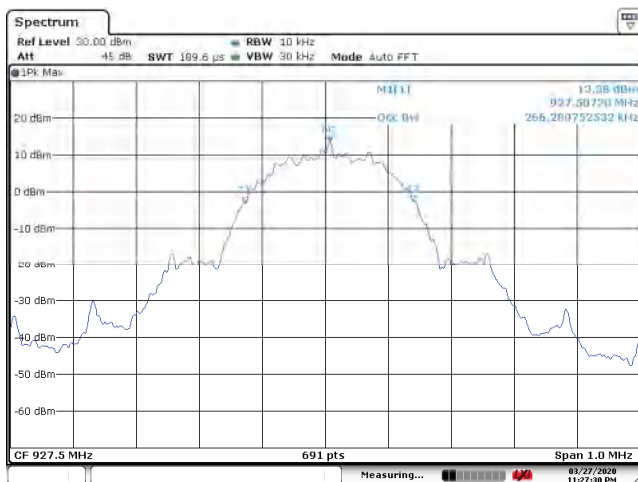
### 6. FSK 250Kbps FHSS, 99% Emission Bandwidth, 902.5MHz~927.5MHz



Date: 27.MAR.2020 23:28:12



Date: 27.MAR.2020 23:27:50



Date: 27.MAR.2020 23:27:30

#### 4.1.4 Maximum Peak Conducted Output Power

**Result:**

**Pass**

Test Specification

Test standard : FCC Part 15.247(b)(2), (3)  
RSS-247 Issue 2 February 2017 Clause 5.4(a), (d)

Basic standard : ANSI C63.10: 2013, clause 11.9.1

KDB558074 D01v05r02, clause 8.3.1.3

Limits : Not more than 1Watt(30dBm) for DTS in the band  
902-928MHz and 2400-2483.5MHz;  
Not more than 1Watt(30dBm) for FHSS with at least  
50 hopping channels in the band 902-928MHz

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 27.03.2020-12.04.2020

Input voltage : DC 4.5V

Operational mode : Mode A

Test channel : Lo, Mi, Hi

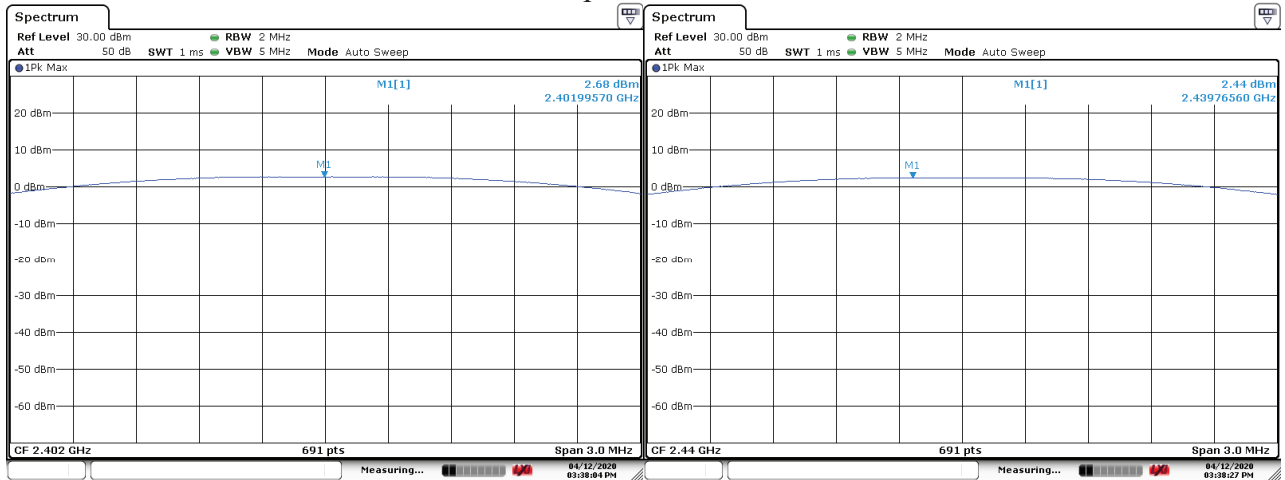
Temperature : 23 °C

Relative humidity : 51%

Atmospheric pressure : 101 kPa

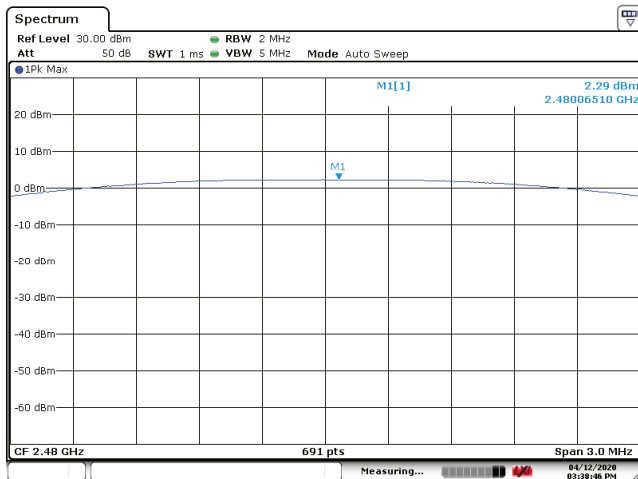
**Table 4: Test result of Maximum Peak Output Power for BLE, LoRa DTS, LoRa FHSS and FSK FHSS**

Modulation Type and Operation band	Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
1. BLE 2402MHz~2480MHz	Low Channel	2402	2.68	30
	Mid Channel	2440	2.44	30
	High Channel	2480	2.29	30
2. LoRa 500kHz DTS 902.5MHz~926.5MHz	Low Channel	902.5	15.39	30
	Mid Channel	914.5	15.03	30
	High Channel	926.5	13.85	30
3. LoRa 125kHz FHSS 902.2MHz~927.8MHz	Low Channel	902.2	15.00	30
	Mid Channel	915	14.04	30
	High Channel	927.8	12.69	30
4. FSK 150Kbps FHSS 902.4MHz~927.6MHz	Low Channel	902.4	15.05	30
	Mid Channel	914.8	14.18	30
	High Channel	927.6	12.71	30
5. FSK 50Kbps FHSS 902.2MHz~927.8MHz	Low Channel	902.2	15.15	30
	Mid Channel	915	14.67	30
	High Channel	927.8	13.38	30
6. FSK 250Kbps FHSS 902.5MHz~927.5MHz 20dB Bandwidth	Low Channel	902.5	14.62	30
	Mid Channel	915	13.41	30
	High Channel	927.5	13.85	30

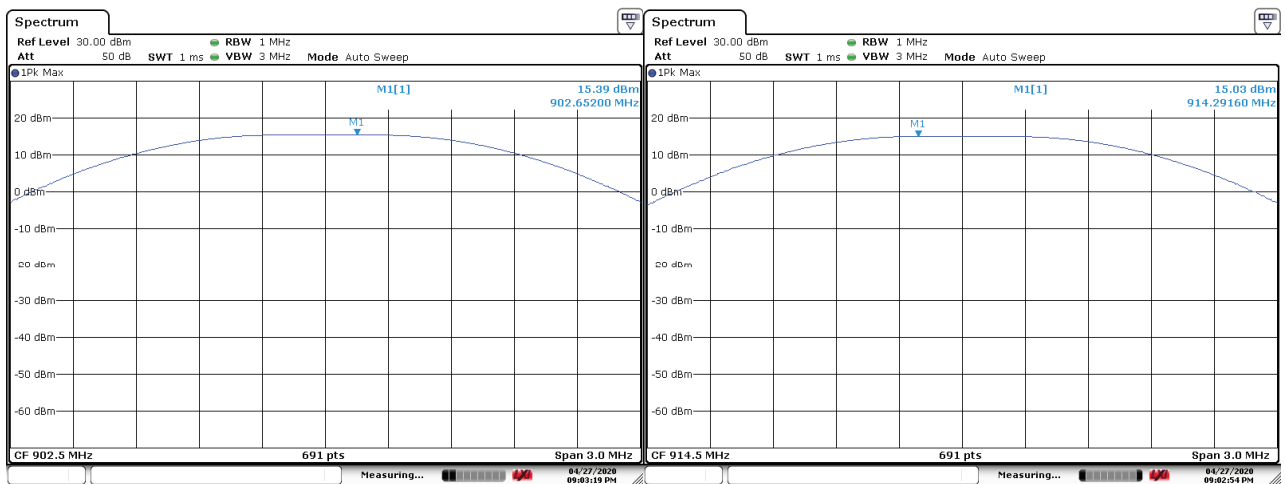
**Figure 3: Maximum peak Conducted Output Power**
**1. BLE, Maximum Peak Conducted Output Power, 2402MHz~2480MHz**


Date: 12.APR.2020 15:38:04

Date: 12.APR.2020 15:38:28

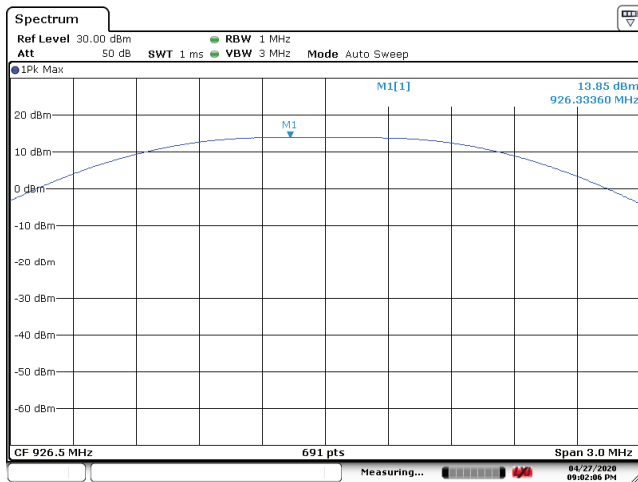


Date: 12.APR.2020 15:38:46

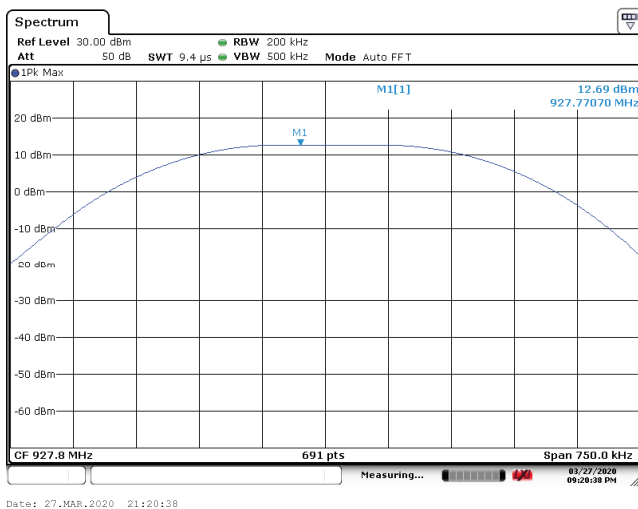
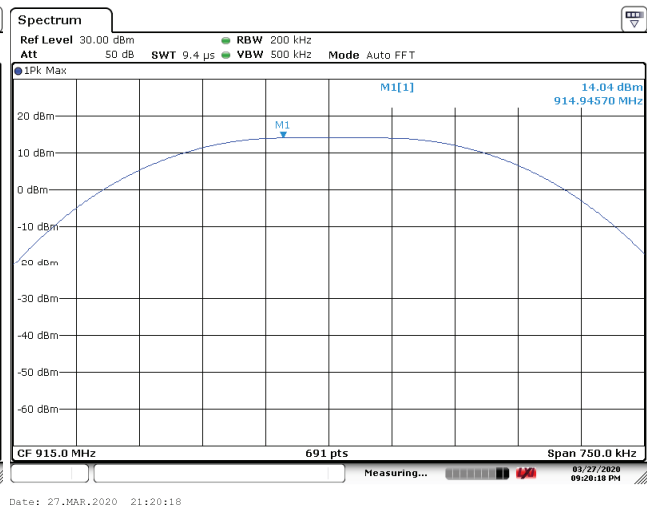
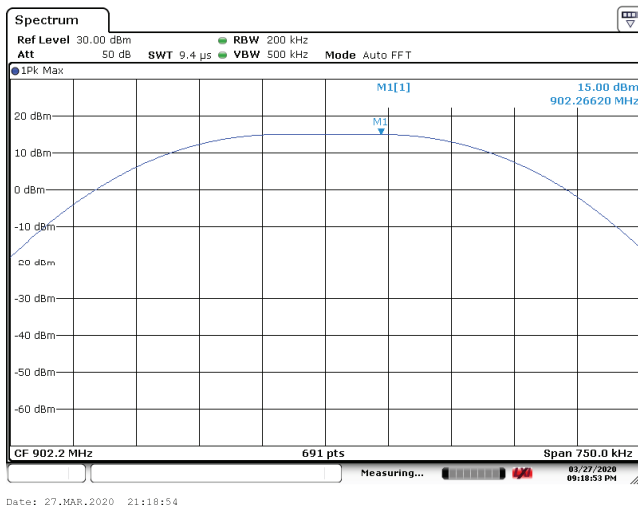
**2. LoRa 500kHz DTS, Maximum Peak Conducted Output Power, 902.5MHz~926.5MHz**


Date: 27.APR.2020 21:03:19

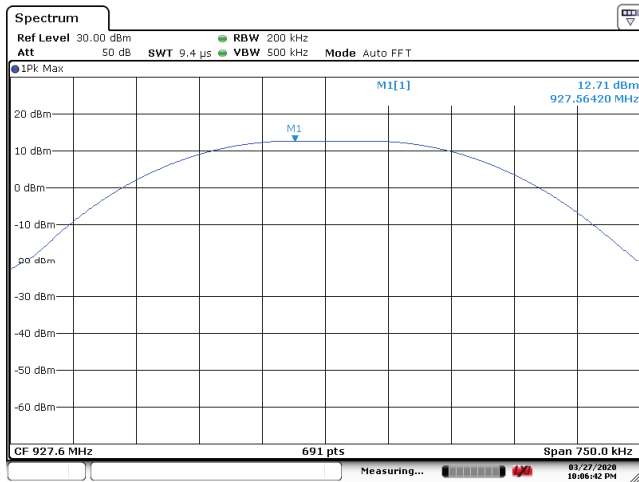
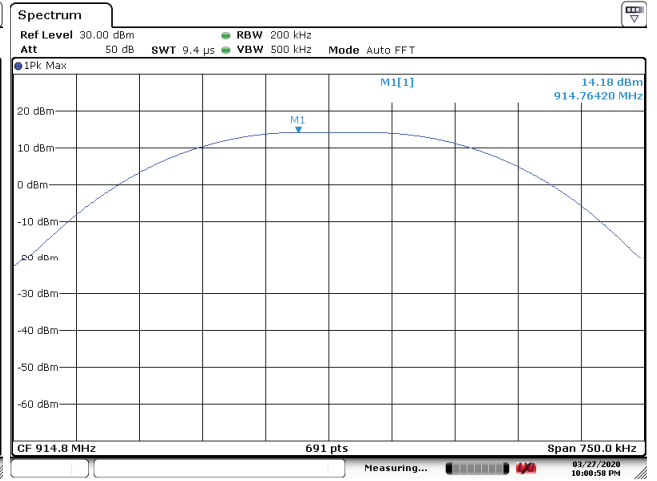
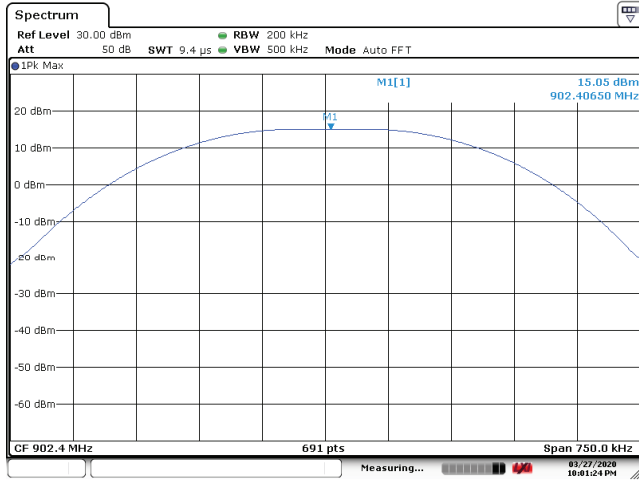
Date: 27.APR.2020 21:02:54



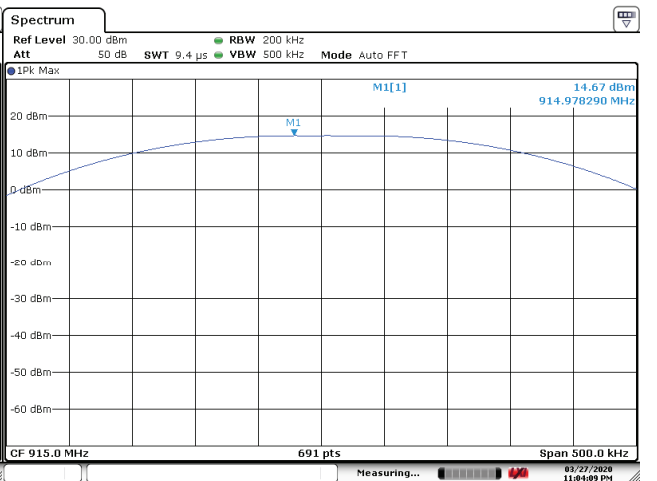
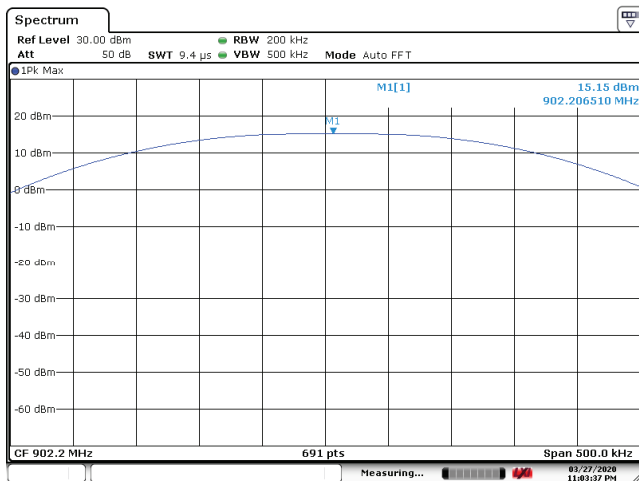
### 3. LoRa 125kHz FHSS, Maximum Peak Conducted Output Power, 902.2MHz~927.8MHz

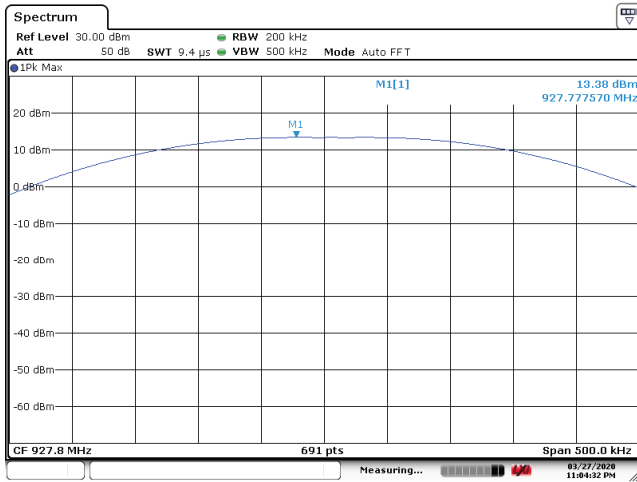


4. FSK 150Kbps FHSS, Maximum Peak Conducted Output Power, 902.4MHz~927.6MHz



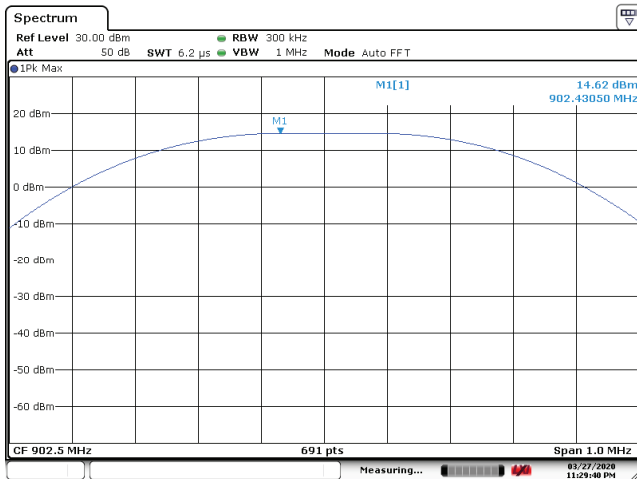
5. FSK 50Kbps FHSS, Maximum Peak Conducted Output Power, 902.2MHz~927.8MHz



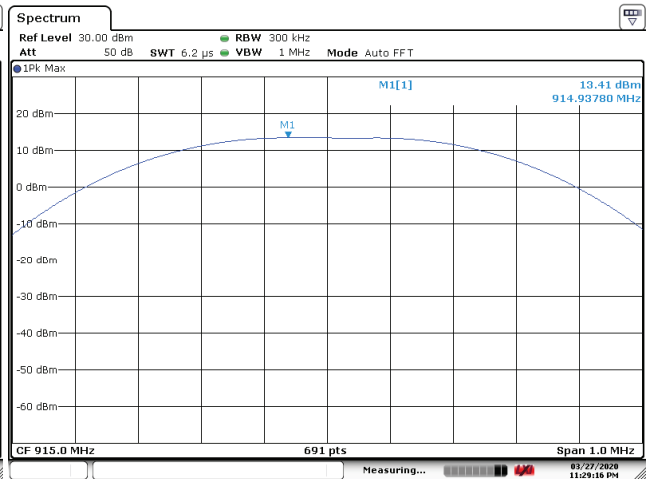


Date: 27.MAR.2020 23:04:33

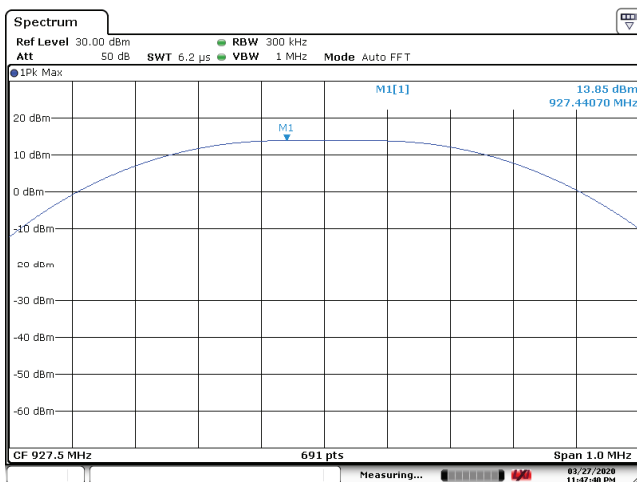
6. FSK 250Kbps FHSS, Maximum Peak Conducted Output Power, 902.5MHz~927.5MHz



Date: 27.MAR.2020 23:29:40



Date: 27.MAR.2020 23:29:16



Date: 27.MAR.2020 23:47:41



### 4.1.5 Equivalent Isotropically Radiated Power

**Result:**
**Pass**
**Test Specification**

Test standard	:	RSS-247 Issue 2 February 2017 Clause 5.4(a), (d)
Basic standard	:	ANSI C63.10: 2013, clause 9.5
Limits	:	Not more than 4Watt(36dBm) for DTS in the band 902-928MHz and 2400-2483.5MHz; Not more than 4Watt(36dBm) for FHSS system with at least 50 hopping channels in the band 902-928MHz
Kind of test site	:	Shielded Room

**Test Setup**

Date of testing	:	27.03.2020-12.04.2020
Input voltage	:	DC 4.5V
Operational mode	:	Mode A
Test channel	:	Lo, Mi, Hi
Temperature	:	23 °C
Relative humidity	:	51%
Atmospheric pressure	:	101 kPa

**Table 5: Test result of E.I.R.P. for BLE, LoRa DTS, LoRa FHSS and FSK FHSS**

Modulation Type and Operation band	Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Antenna Gain (dBi)	E.I.R.P. (dBm)	Limit (dBm)
1. BLE 2402MHz~2480MHz	Low Channel	2402	2.68	3.26	5.94	36
	Mid Channel	2440	2.44	3.26	5.70	36
	High Channel	2480	2.29	3.26	5.55	36
2. LoRa 500kHz DTS 902.5MHz~926.5MHz	Low Channel	902.5	15.39	1.1	16.49	36
	Mid Channel	914.5	15.03	1.1	16.13	36
	High Channel	926.5	13.85	1.1	14.95	36
3. LoRa 125kHz FHSS 902.2MHz~927.8MHz	Low Channel	902.2	15.00	1.1	16.10	36
	Mid Channel	915	14.04	1.1	15.14	36
	High Channel	927.8	12.69	1.1	13.79	36
4. FSK 150Kbps FHSS 902.4MHz~927.6MHz	Low Channel	902.4	15.05	1.1	16.15	36
	Mid Channel	914.8	14.18	1.1	15.28	36
	High Channel	927.6	12.71	1.1	13.81	36
5. FSK 50Kbps FHSS 902.2MHz~927.8MHz	Low Channel	902.2	15.15	1.1	16.25	36
	Mid Channel	915	14.67	1.1	15.77	36
	High Channel	927.8	13.38	1.1	14.48	36
6. FSK 250Kbps FHSS 902.5MHz~927.5MHz	Low Channel	902.5	14.62	1.1	15.72	36
	Mid Channel	915	13.41	1.1	14.51	36
	High Channel	927.5	13.85	1.1	14.95	36

### 4.1.6 Peak Power Spectral Density

**Result:**

**Pass**

Test Specification

Test standard : FCC Part 15.247(e)  
RSS-247 Issue 2 February 2017 Clause 5.2(b)

Basic standard : ANSI C63.10: 2013, clause 11.10.2  
KDB558074 D01v05r02, clause 8.4

Limits : Not more than 8 dBm in any 3 kHz band

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 27.03.2020-12.04.2020

Input voltage : DC 4.5V

Operational mode : Mode A

Test channel : Lo, Mi, Hi

Temperature : 23°C

Relative humidity : 51%

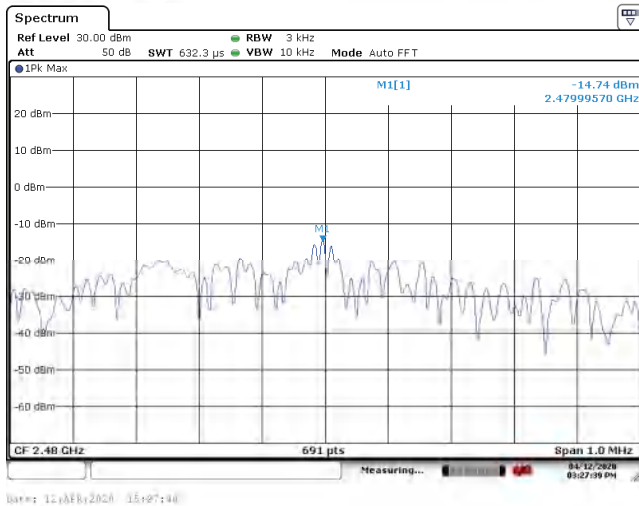
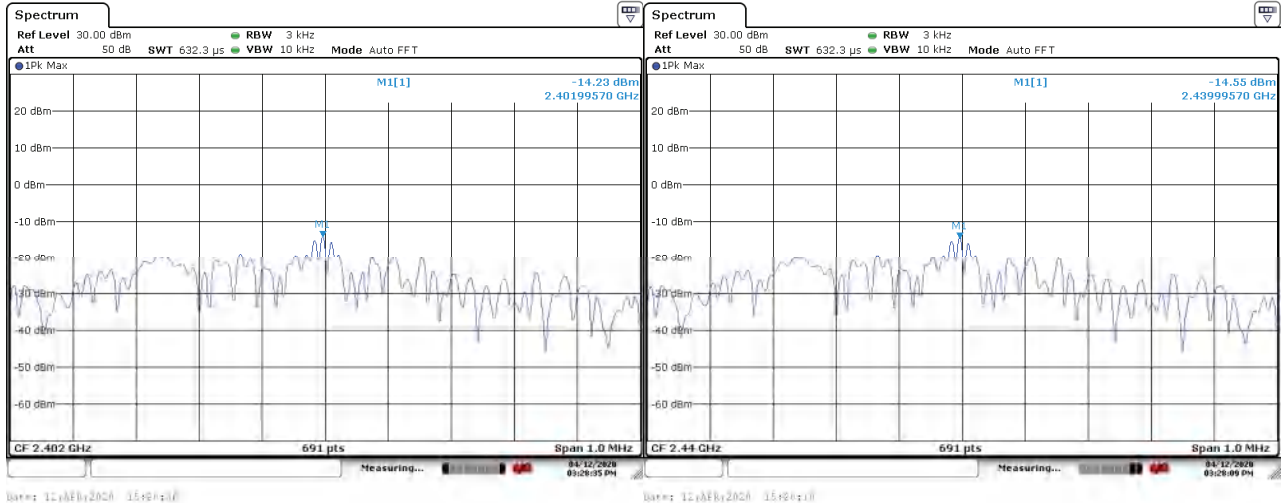
Atmospheric pressure : 101 kPa

**Table 6: Test result of Power Spectral Density for BLE, LoRa DTS**

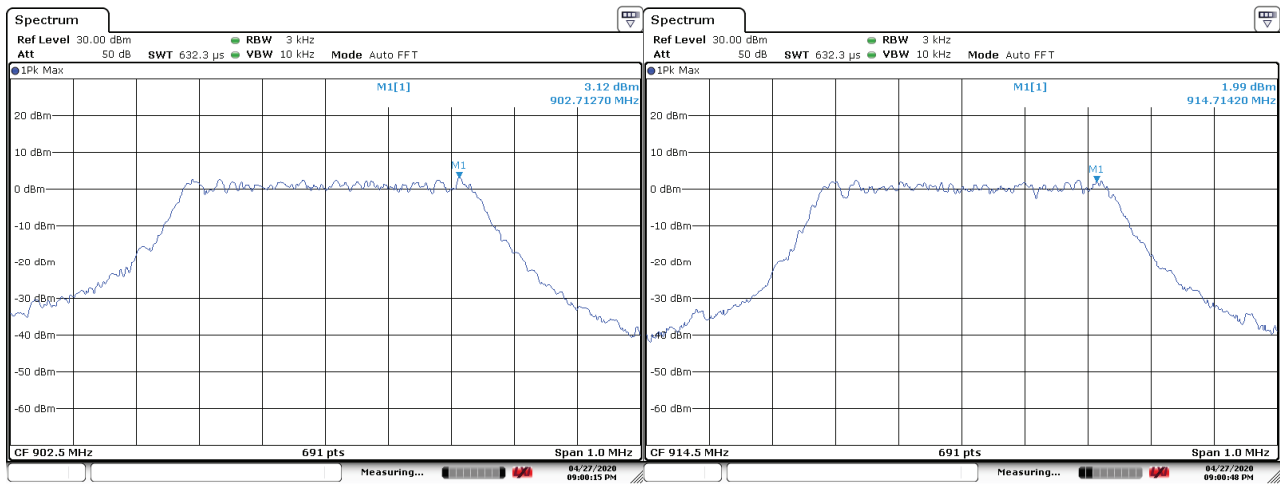
Modulation Type and Operation band	Channel	Channel Frequency (MHz)	Measured Power Density (dBm)	Limit (dBm)	Result
1. BLE 2402MHz~2480MHz	Low Channel	2402	-14.23	8.0	Pass
	Mid Channel	2440	-14.55	8.0	Pass
	High Channel	2480	-14.74	8.0	Pass
2. LoRa 500kHz DTS 902.5MHz~926.5MHz	Low Channel	902.5	3.12	8.0	Pass
	Mid Channel	914.5	1.99	8.0	Pass
	High Channel	926.5	0.74	8.0	Pass

Figure 4: Power Spectral Density

1. BLE, PSD, 2402MHz~2480MHz

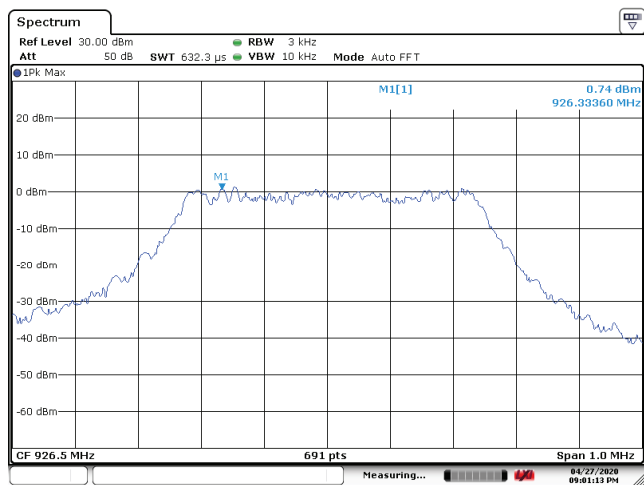


2. LoRa 500KHz DTS, PSD, 902.5MHz~926.5MHz



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Test Report No.:

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Date: 27.APR.2020 21:01:13

### 4.1.7 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

**Result:**

**Pass**

Test Specification	
Test standard	: FCC Part 15.247(d) RSS-247 Issue 2 February 2017 Clause 5.5
Basic standard	: ANSI C63.10: 2013, 14.3.3(Spurious ) ANSI C63.10: 2013, 6.10(Band edge) KDB 558074 D01 v05r02, clause 8.5
Limits	: 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);
Kind of test site	: Shielded Room

**Test Setup**

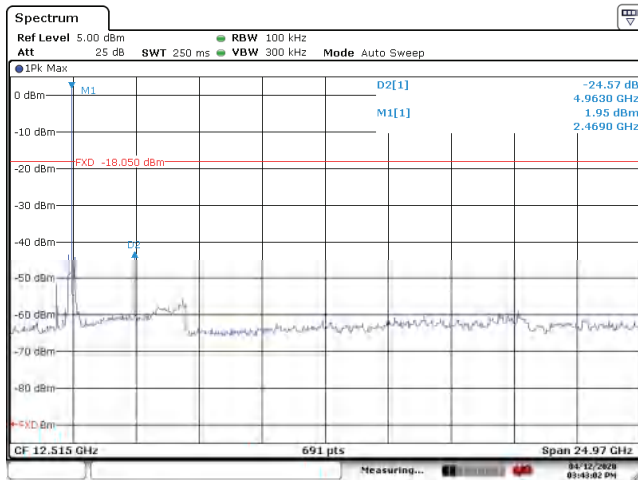
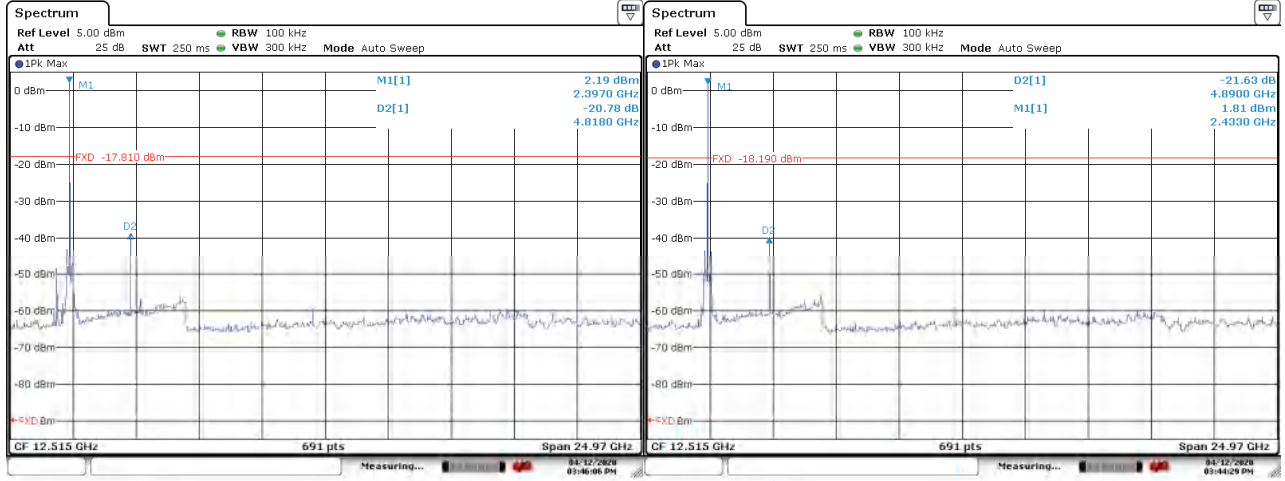
Date of testing	: 27.03.2020-12.04.2020
Input voltage	: DC 4.5V
Operational mode	: Mode A, Mode B
Test channel	: Lo, Mi, Hi
Temperature	: 23°C
Relative humidity	: 51%
Atmospheric pressure	: 101 kPa

All emissions are more than 20dB below fundamental, compliance is achieved as well.

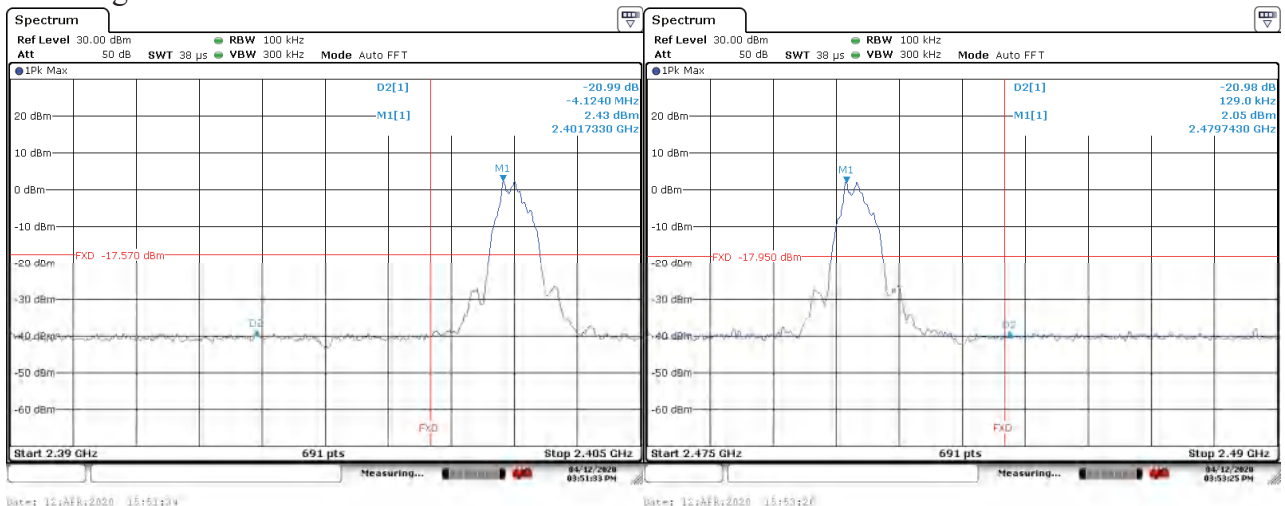
Figure 5: Conducted Spurious Emission

1. BLE, Conducted Spurious Emission and Band edge, 2402MHz~2480MHz

Conducted Spurious Emission

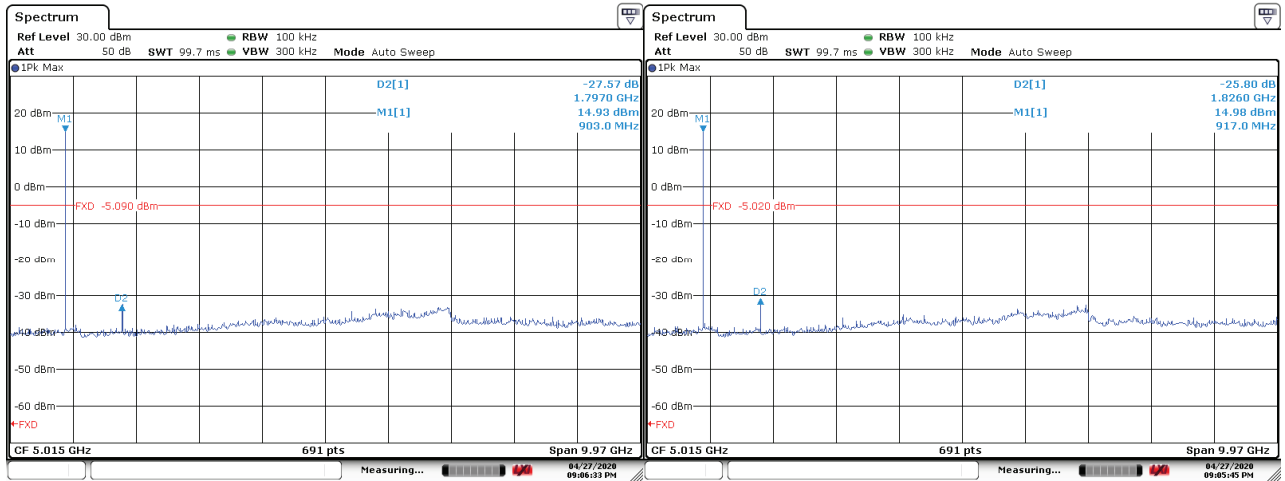


Band edge



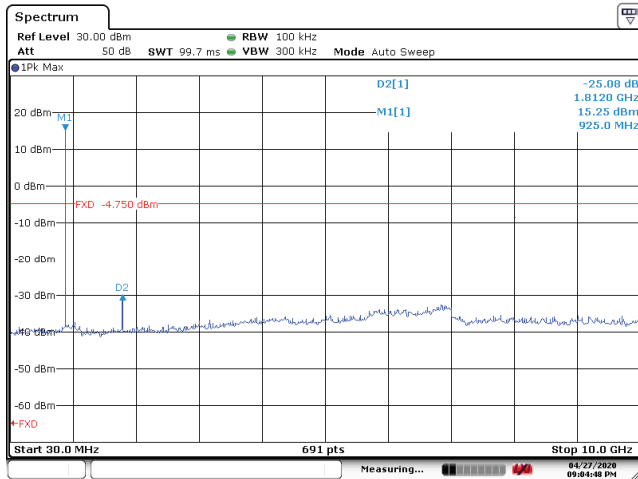
## 2. LoRa 500kHz DTS, Conducted Spurious Emission and Band edge, 902.5MHz~926.5MHz

### Conducted Spurious Emission



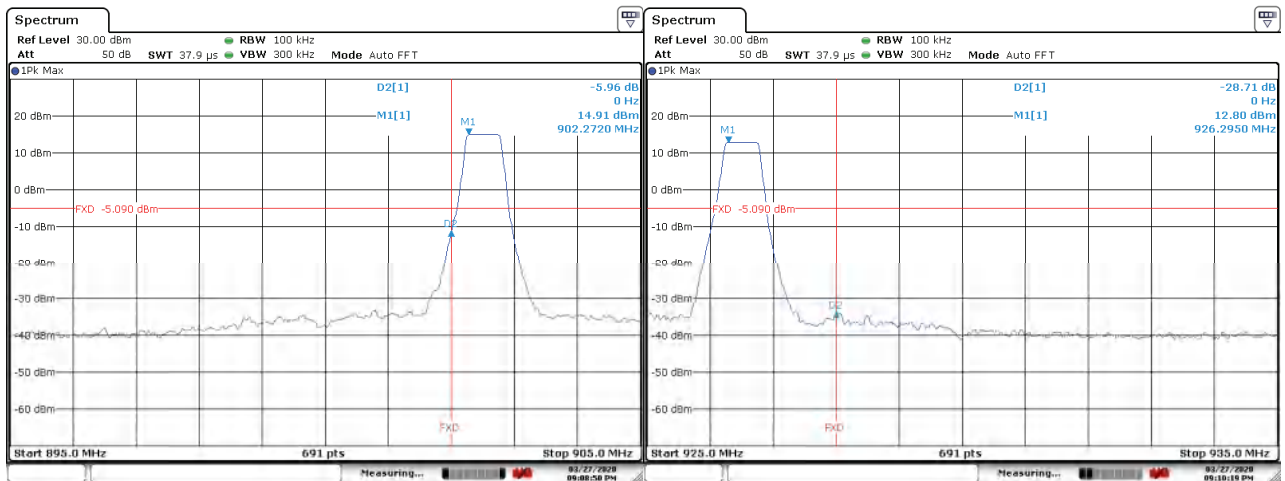
Date: 27.APR.2020 21:06:33

Date: 27.APR.2020 21:05:45



Date: 27.APR.2020 21:04:48

### Band edge

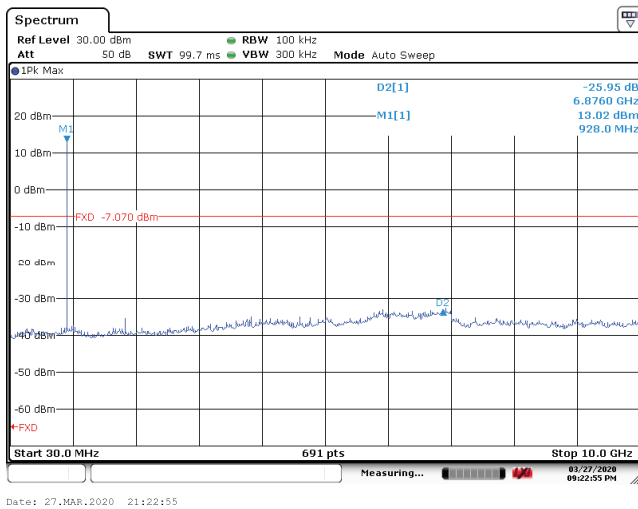
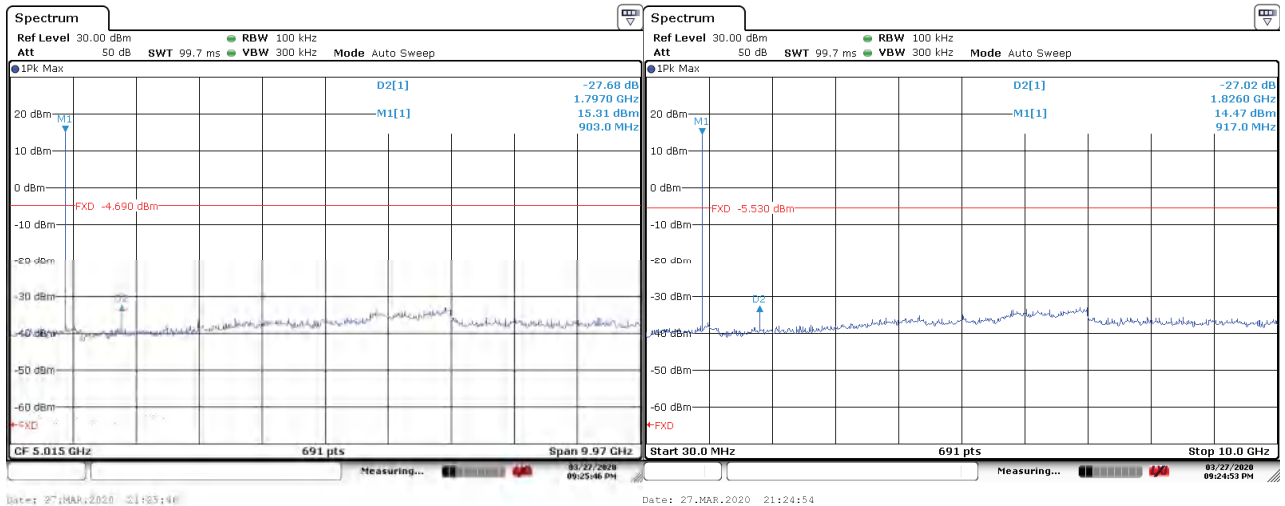


Date: 27.APR.2020 21:08:50

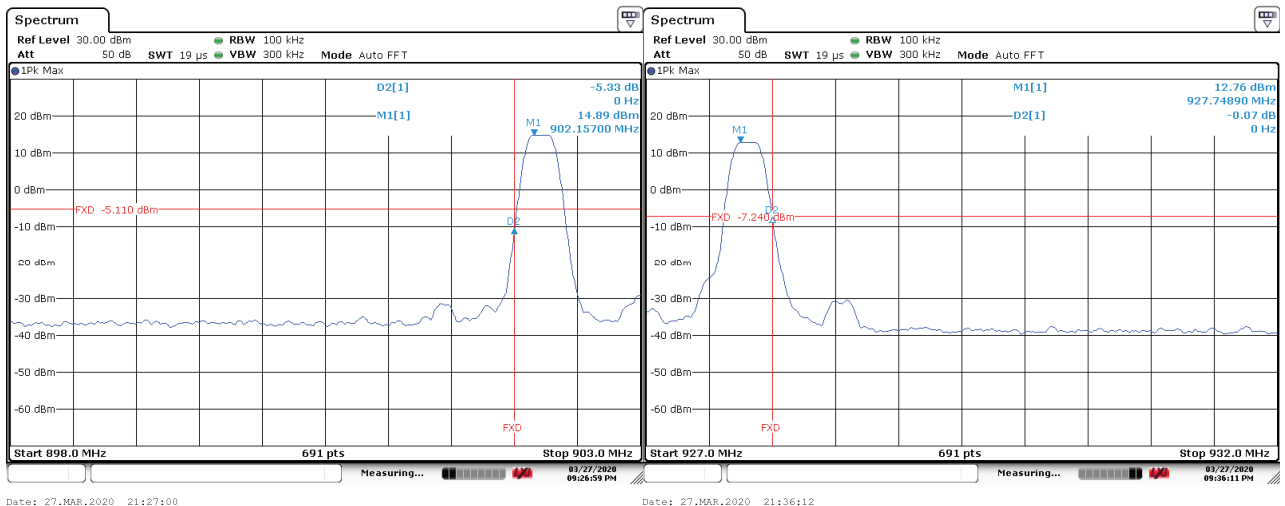
Date: 27.APR.2020 21:10:15

### 3. LoRa 125kHz FHSS, Conducted Spurious Emission, 902.2MHz~927.8MHz

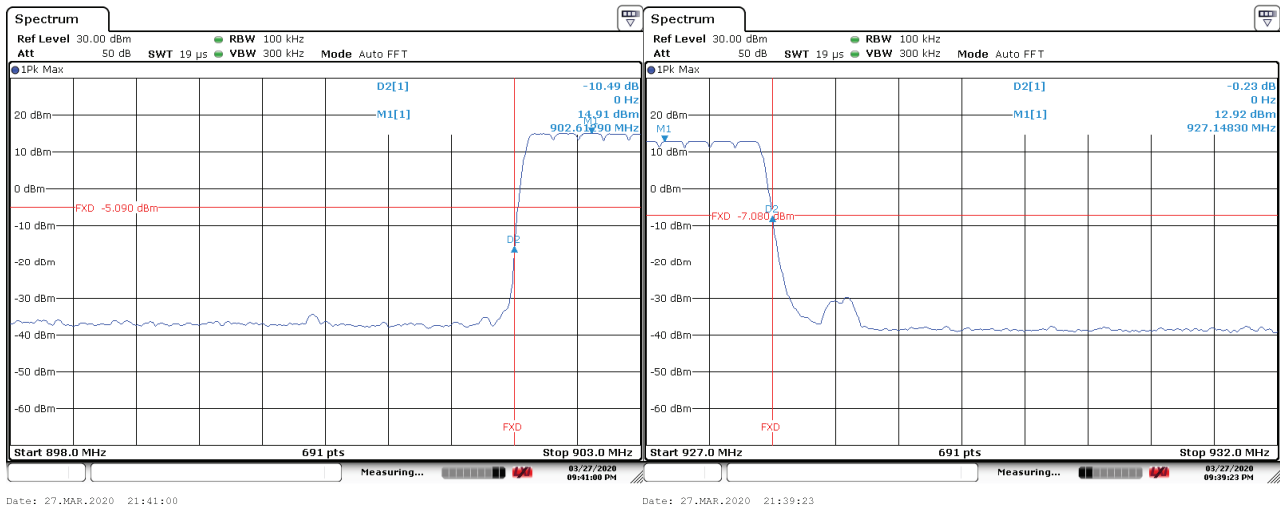
#### Conducted Spurious Emission



#### Band edge

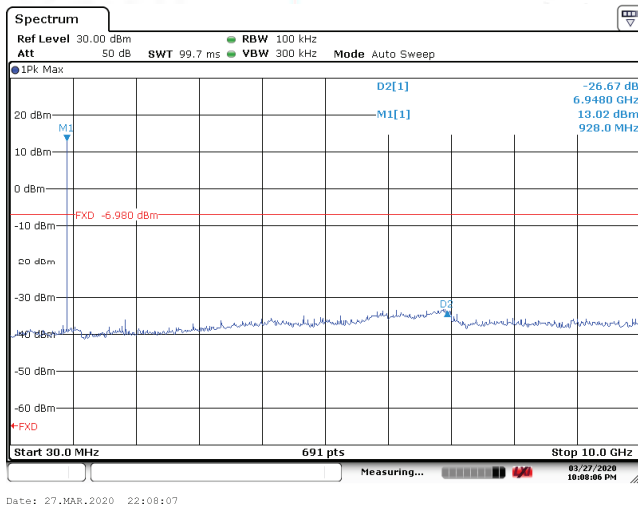
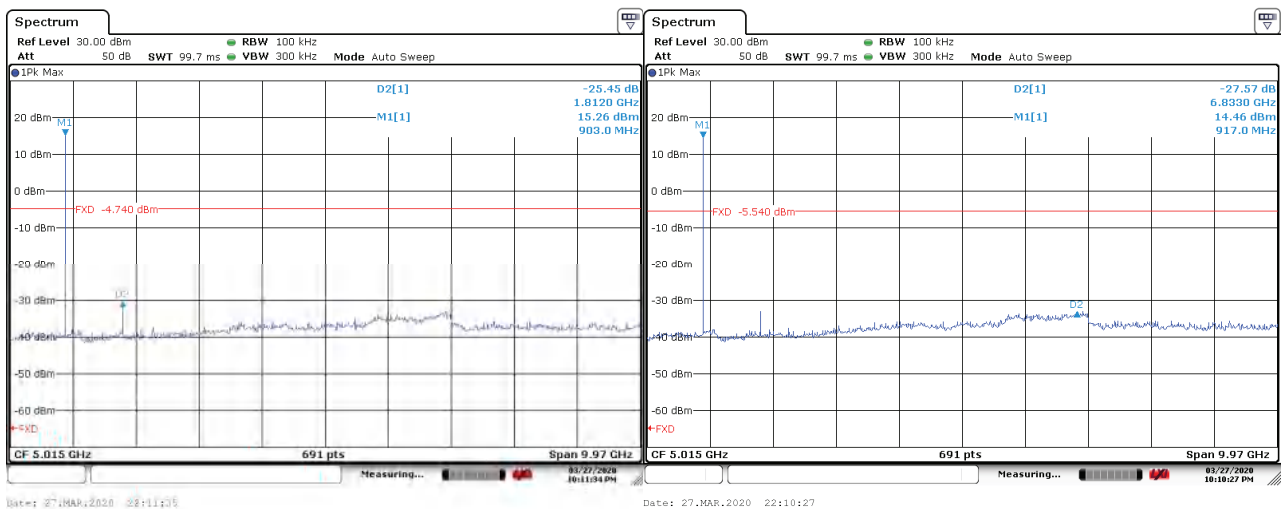




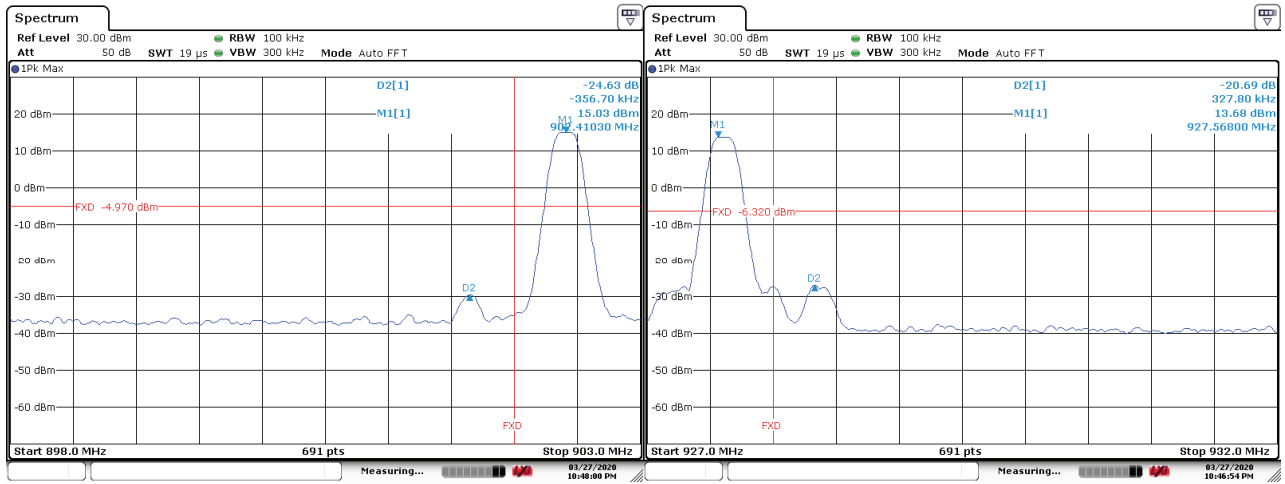


#### 4. FSK 150Kbps FHSS, Conducted Spurious Emission and Band edge, 902.4MHz~927.6MHz

##### Conducted Spurious Emission

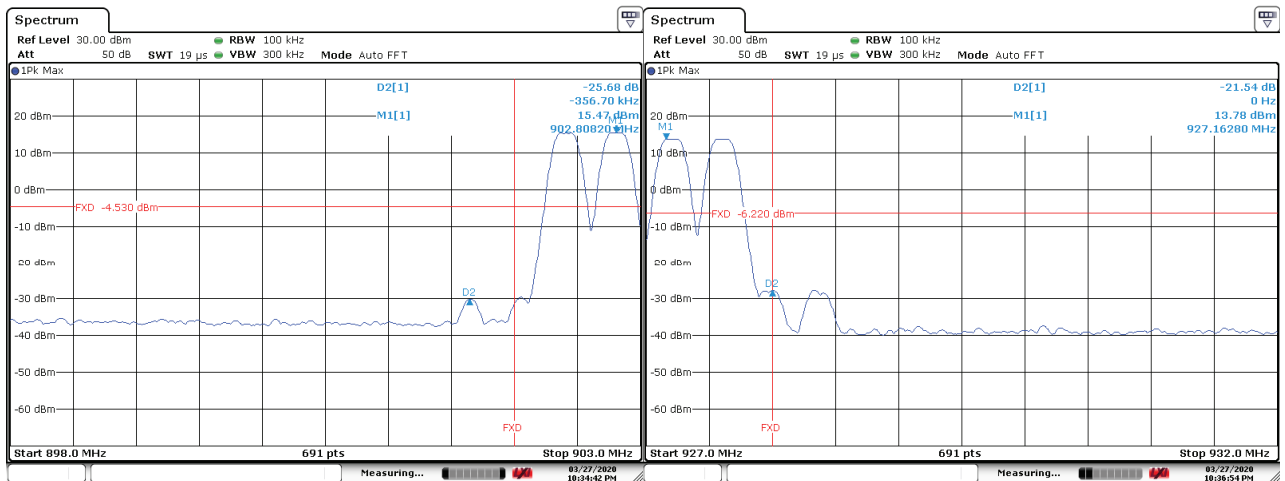


Band edge



Date: 27\_MAR\_2020 22:48:00

Date: 27\_MAR\_2020 22:46:54

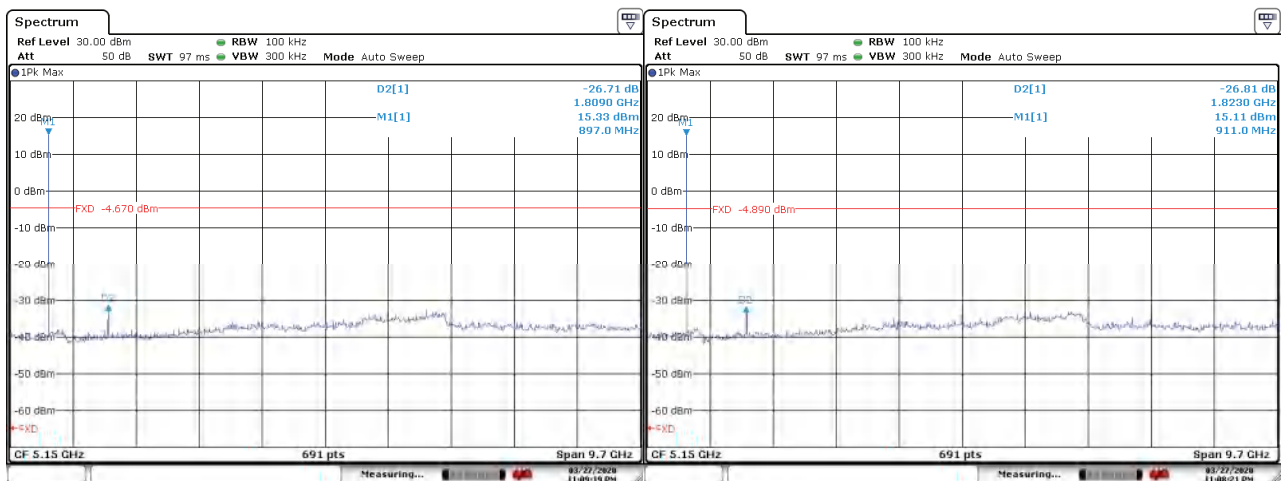


Date: 27\_MAR\_2020 22:34:43

Date: 27\_MAR\_2020 22:36:55

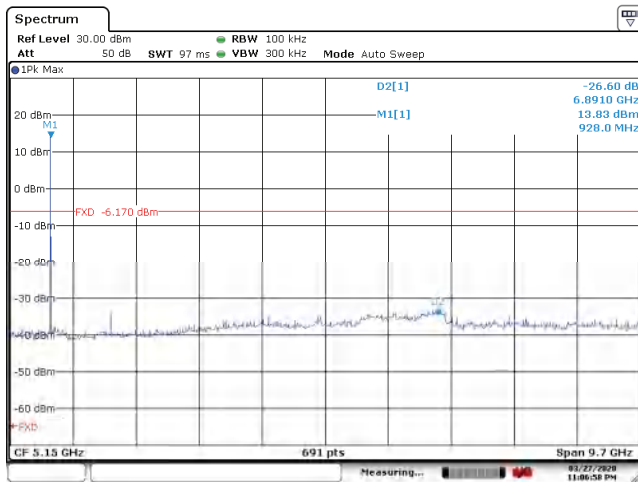
5. FSK 50Kbps FHSS, Conducted Spurious Emission and Band edge, 902.2MHz~927.8MHz

Conducted Spurious Emission

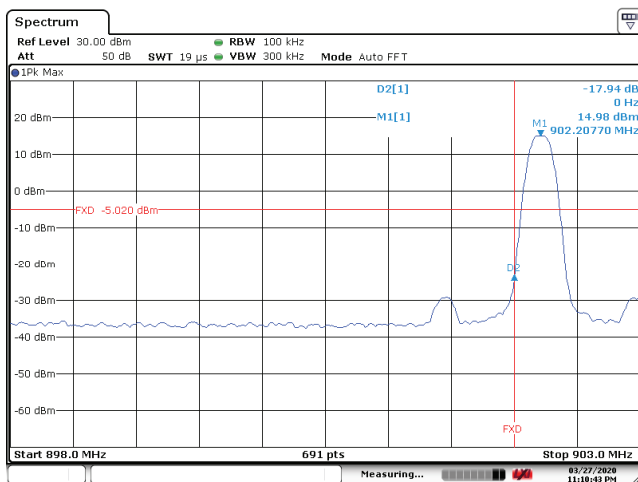


Date: 27\_MAR\_2020 23:03:21

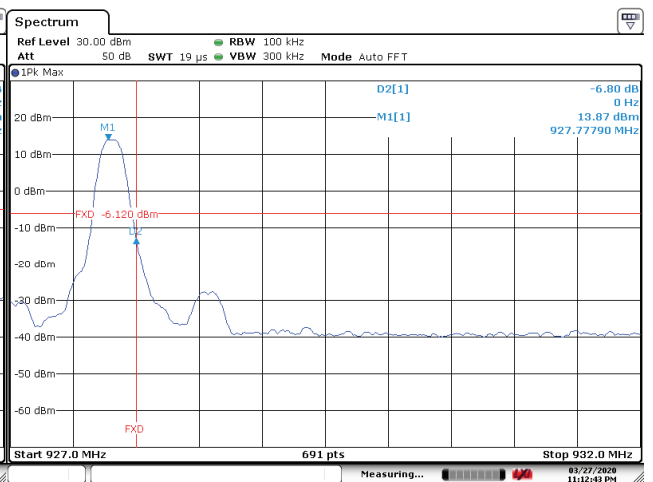
Date: 27\_MAR\_2020 23:04:23



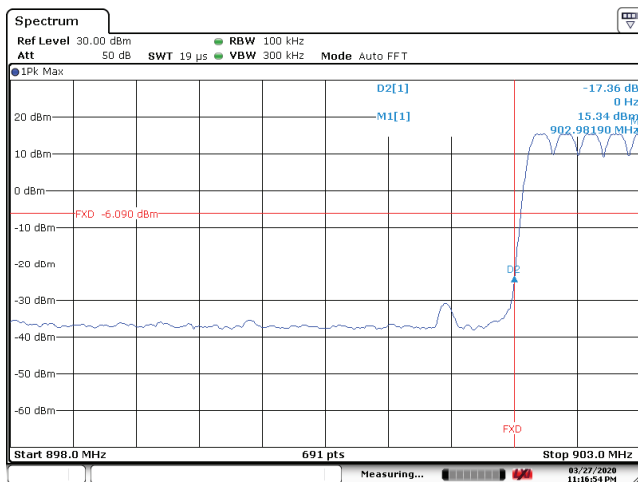
Date: 27.MAR.2020 23:06:57

**Band edge**


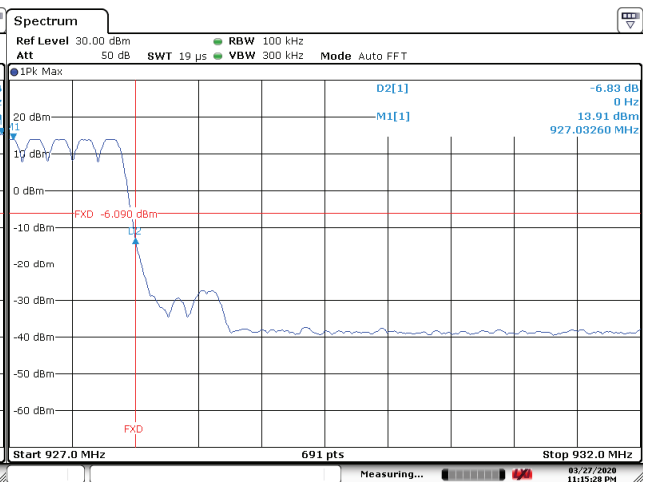
Date: 27.MAR.2020 23:10:44



Date: 27.MAR.2020 23:12:44



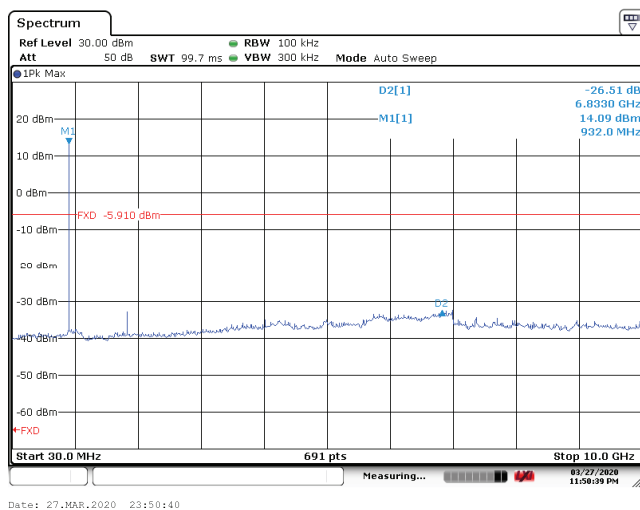
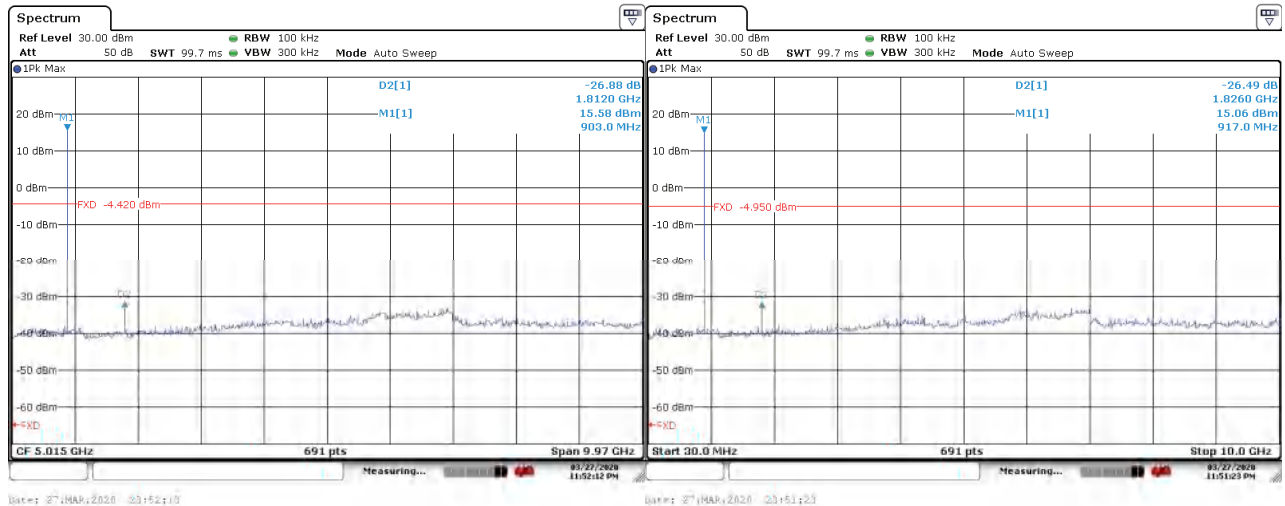
Date: 27.MAR.2020 23:16:55



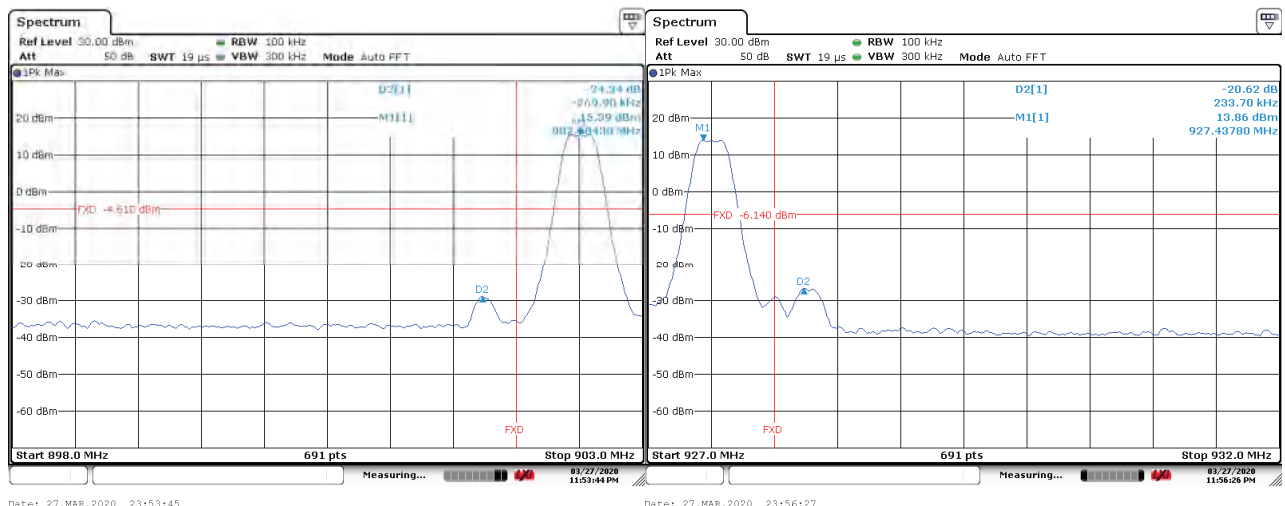
Date: 27.MAR.2020 23:15:29

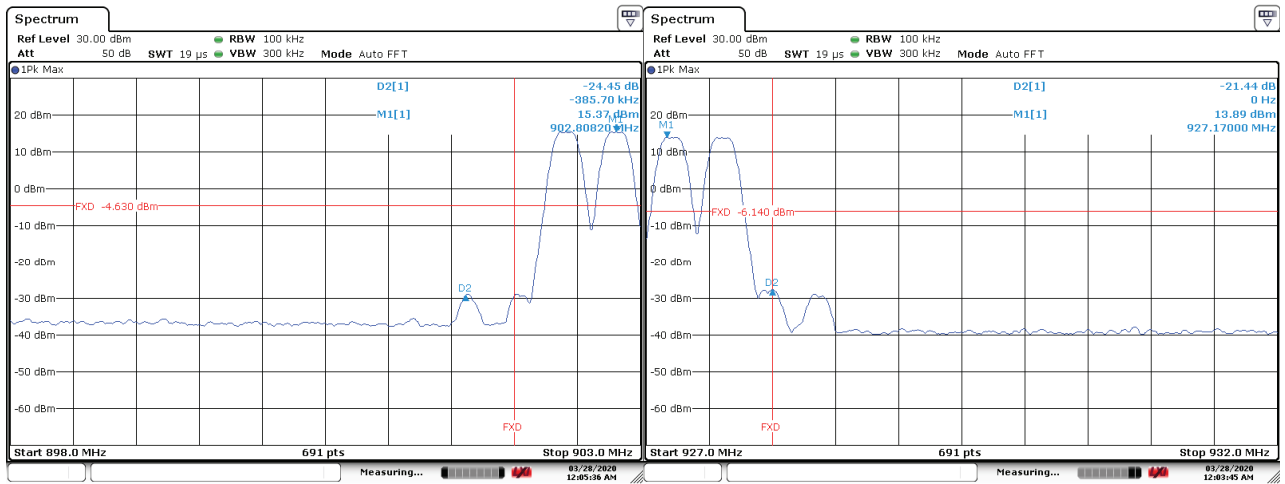
## 6. FSK 250Kbps FHSS, Conducted Spurious Emission and Band edge, 902.5MHz~927.5MHz

### Conducted Spurious Emission



### Band edge





Date: 28.MAR.2020 00:05:36

Date: 28.MAR.2020 00:03:45

### 4.1.8 Carrier Separation Measurement

**Result:**

**Pass**

Test Specification

- Test standard : FCC Part 15.247(a)(1)  
RSS-247 Issue 2 February 2017 Clause 5.1(b)
- Basic standard : ANSI C63.10: 2013, clause 7.8.2
- Limits : At least 20 dB bandwidth or 25kHz, whichever is greater.
- Kind of test site : Shielded Room

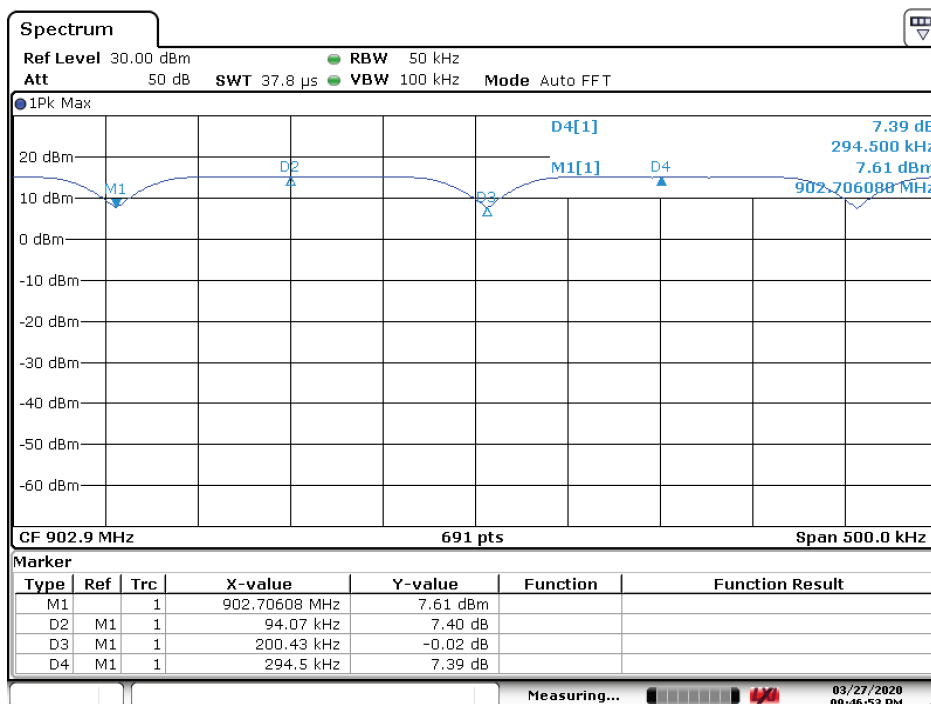
**Test Setup**

- Date of testing : 27.03.2020
- Input voltage : DC 4.5V
- Operational mode : Mode B
- Temperature : 23°C
- Relative humidity : 51%
- Atmospheric pressure : 101 kPa

**Figure 6: Carrier Separation**

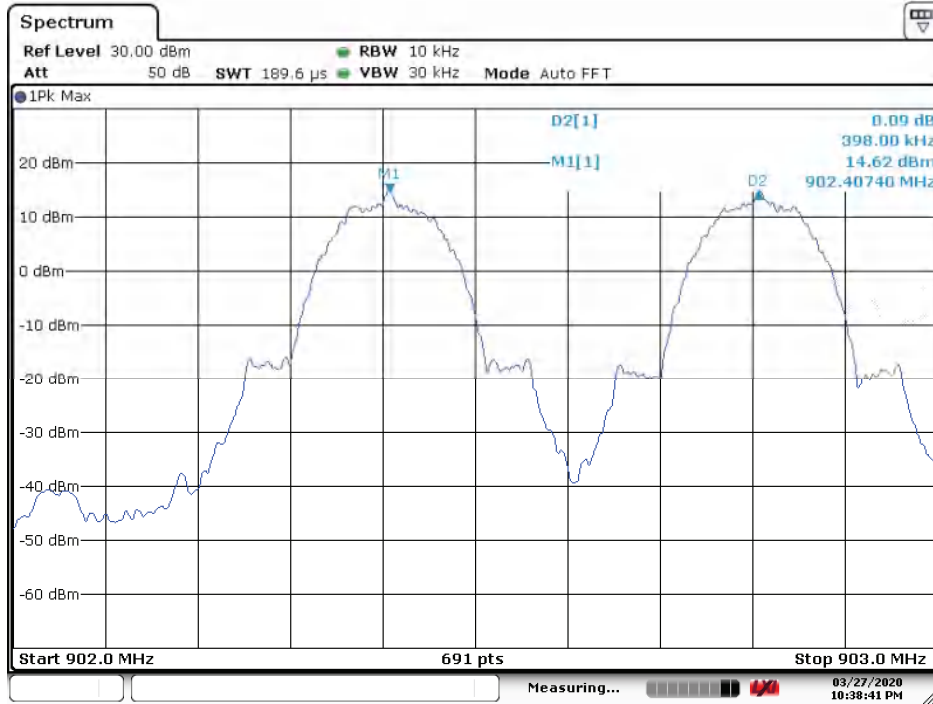
1. LoRa125kHz FHSS, Carrier Separation, 902.2MHz~927.8MHz

Carrier Separation: 200.43kHz



2. FSK 150Kbps FHSS, Carrier Separation, 902.4MHz~927.6MHz

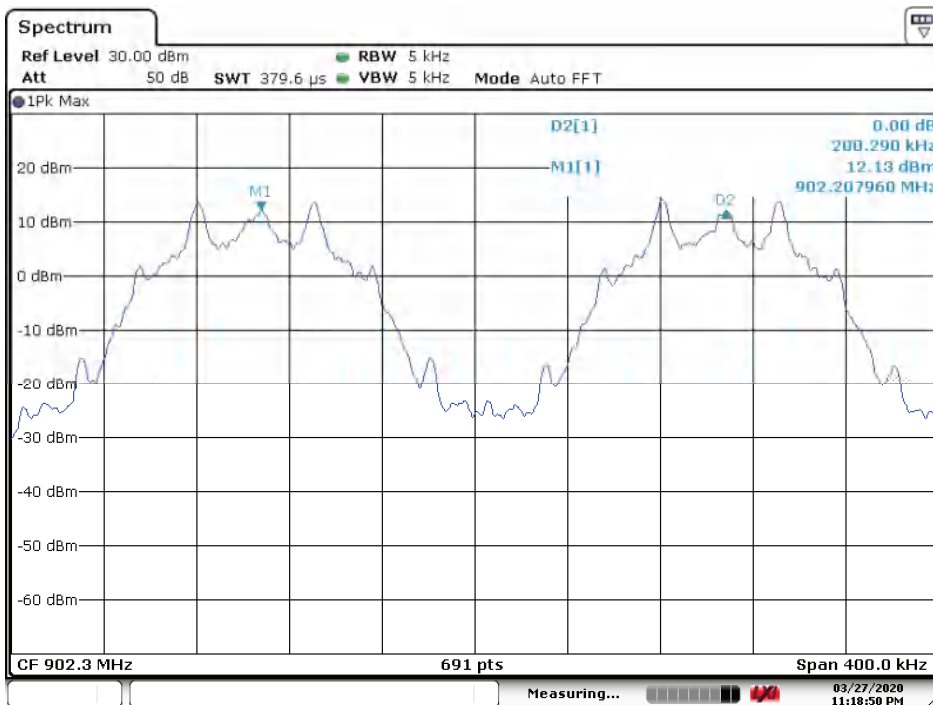
Carrier Separation: 398.00kHz



Date: 27.MAR.2020 22:38:41

3. FSK 50Kbps FHSS, Carrier Separation, 902.2MHz~927.8MHz

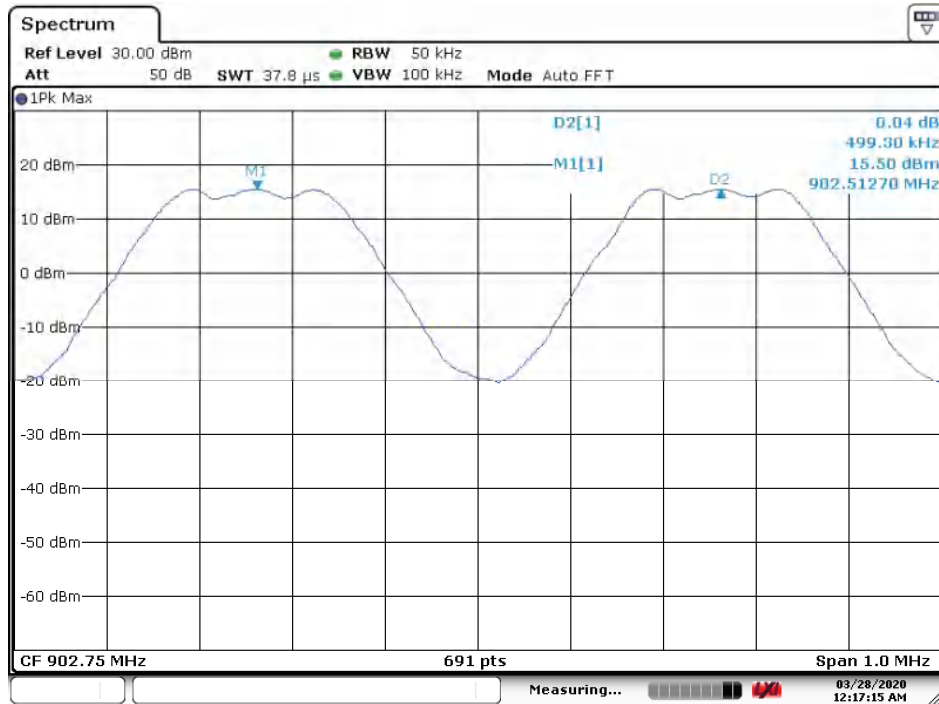
Carrier Separation: 200.29kHz



Date: 27.MAR.2020 23:18:51

4. FSK 250Kbps FHSS, Carrier Separation, 902.5MHz~927.5MHz

Carrier Separation: 499.30kHz



Date: 28.MAR.2020 00:17:15



### 4.1.9 The number of hopping channels

**Result:**

**Pass**

Test Specification

- Test standard : FCC Part 15.247(a)(1)(i)  
RSS-247 Issue 2 February 2017 Clause 5.1(c)
- Basic standard : ANSI C63.10: 2013, clause 7.8.3
- Limits : At least 50 for 20dB bandwidth less than 250kHz  
At least 25 for 20dB bandwidth at least 250kHz
- Kind of test site : Shielded Room

**Test Setup**

- Date of testing : 27.03.2020-28.03.2020
- Input voltage : DC 4.5V
- Operational mode : Mode B
- Temperature : 23°C
- Relative humidity : 51%
- Atmospheric pressure : 101 kPa

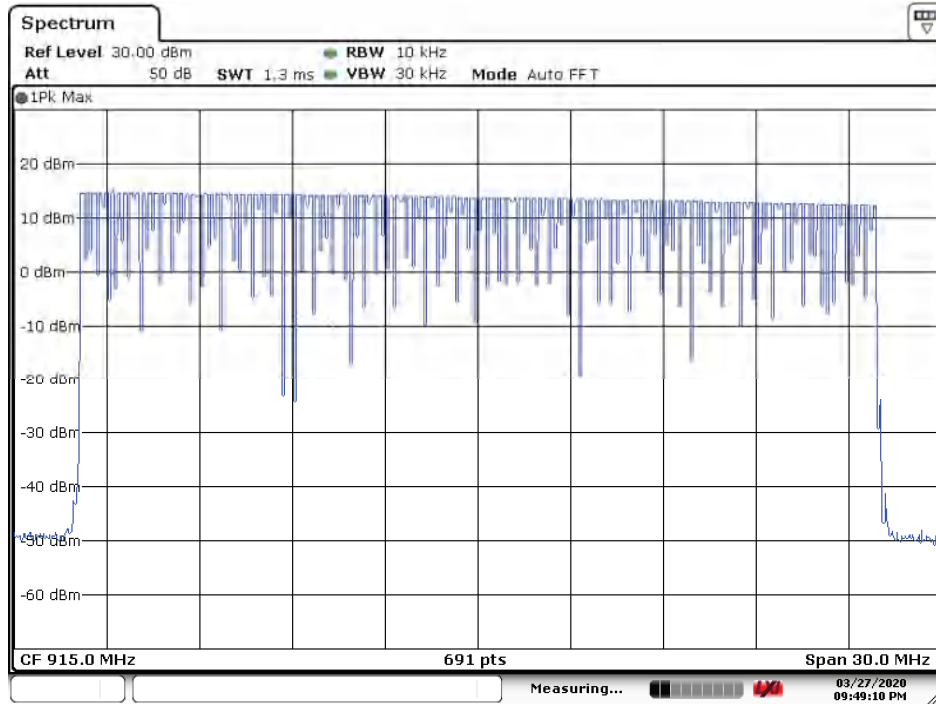
**Table 7: Test result of hopping channel number for LoRa FHSS and FSK FHSS**

Modulation Type and Operation band	20dB Bandwidth(kHz)	Channel Number	Limit	Result
LoRa 125kHz FHSS 902.2MHz~927.8MHz	20dB Bandwidth < 250	129	50	Pass
FSK 150Kbps FHSS 902.4MHz~927.6MHz	20dB Bandwidth < 250	64	50	Pass
FSK 50Kbps FHSS 902.2MHz~927.8MHz	20dB Bandwidth < 250	129	50	Pass
FSK 250Kbps FHSS 902.5MHz~927.5MHz	250 ≤ 20dB Bandwidth < 500	51	25	Pass

**Figure 7: The number of hopping channels**

1. LoRa 125kHz FHSS, 902.2MHz~927.8MHz

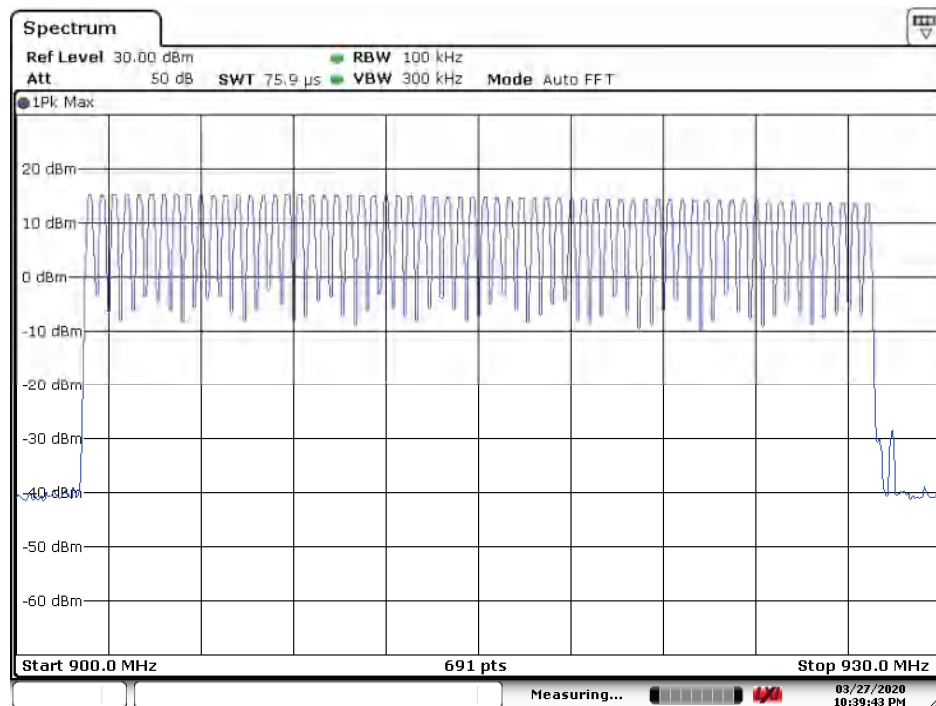
Channel Number: 129



Date: 27.MAR.2020 21:49:10

2. FSK 150Kbps FHSS, 902.4MHz~927.6MHz

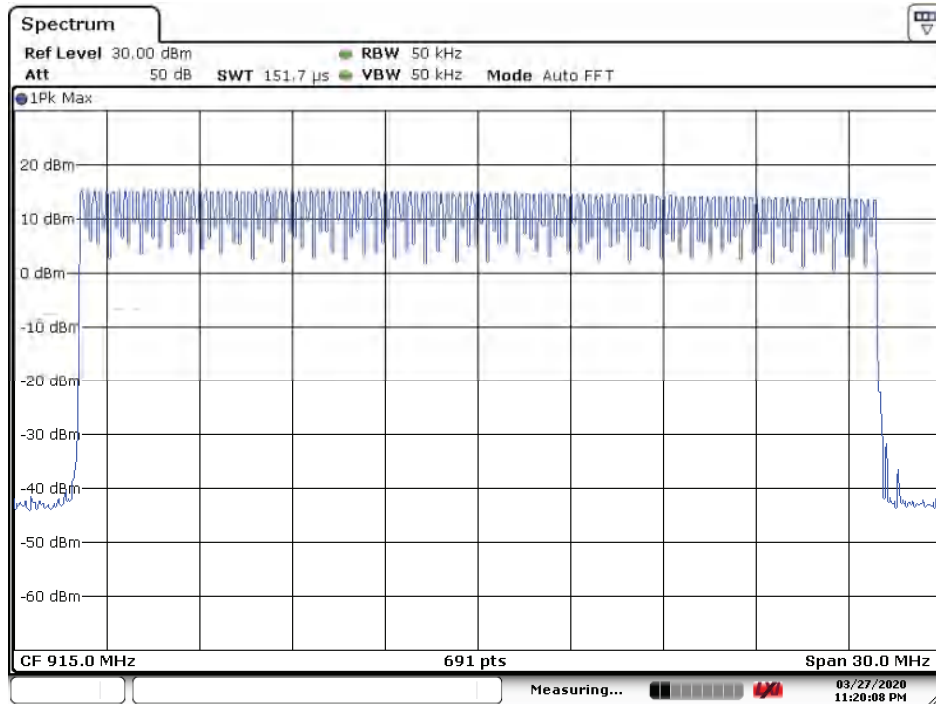
Channel Number: 64



Date: 27.MAR.2020 22:39:44

3. FSK 50Kbps FHSS, 902.2MHz~927.8MHz

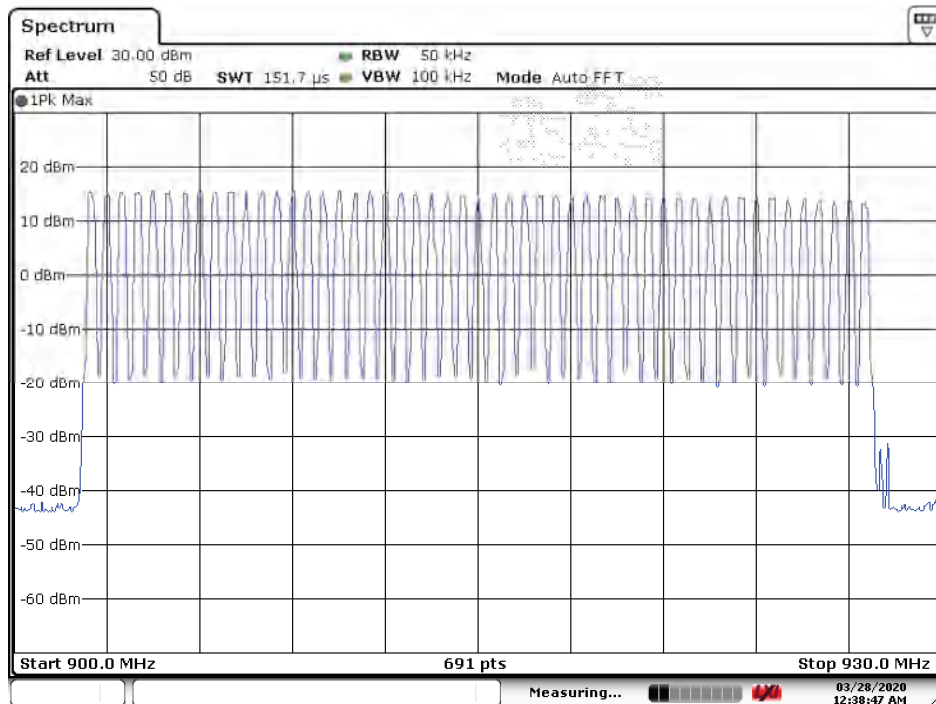
Channel Number: 129



Date: 27.MAR.2020 23:20:08

4. FSK 250Kbps FHSS, 902.5MHz~927.5MHz

Channel Number: 51



Date: 28.MAR.2020 00:38:47

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### 4.1.10 Channel Occupancy Time

**Result:**

**Pass**

Test Specification

Test standard : FCC Part 15.247(a)(1)(i)  
RSS-247 Issue 2 February 2017 Clause 5.1(c)

Basic standard : ANSI C63.10: 2013, clause 7.8.4

Limits : Not more than 0.4s

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 27.03.2020-28.03.2020

Input voltage : DC 4.5V

Operational mode : Mode B

Temperature : 21°C

Relative humidity : 53%

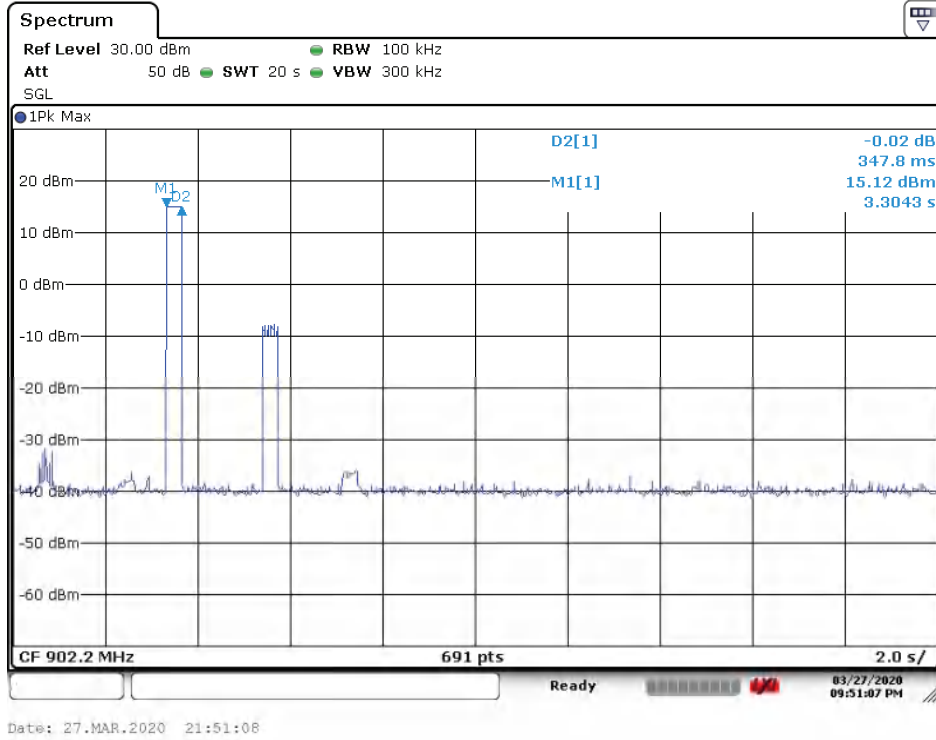
Atmospheric pressure : 101 kPa

**Table 8: Test result of Channel Occupancy Time for LoRa FHSS and FSK FHSS**

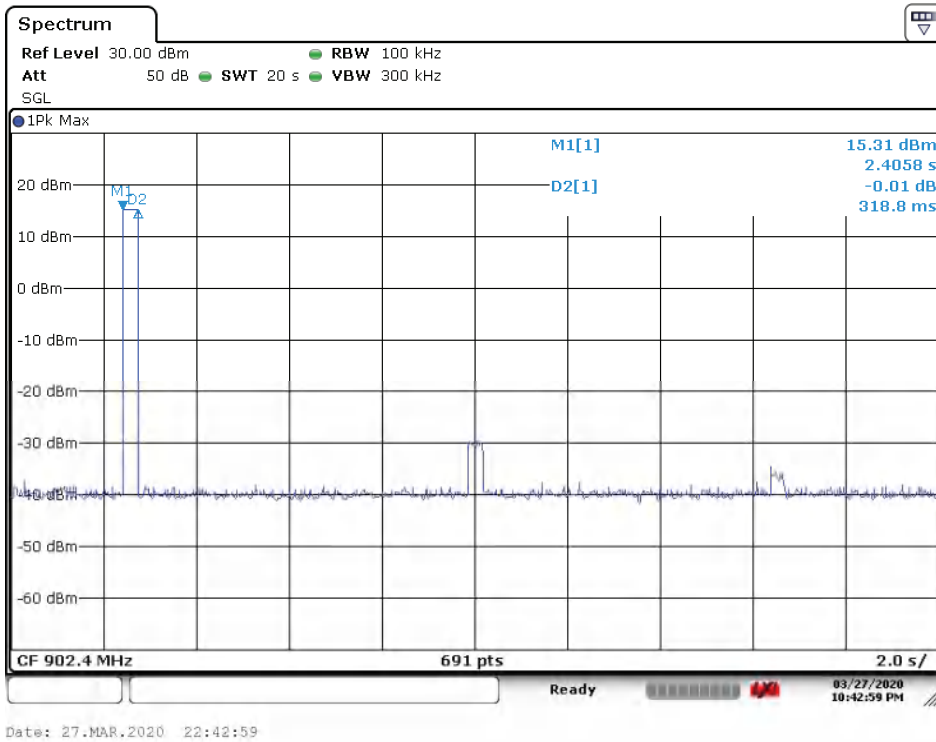
Modulation Type and Operation band	20dB Bandwidth(kHz)	Period (s)	Channel Occupancy Time (ms)	Limit (s)	Result
LoRa 125kHz FHSS 902.2MHz~927.8MHz	20dB Bandwidth < 250	20	347.8	0.4	Pass
FSK 150kbps FHSS 902.4MHz~927.6MHz	20dB Bandwidth < 250	20	318.8	0.4	Pass
FSK 50Kbps FHSS 902.2MHz~927.8MHz	20dB Bandwidth < 250	20	289.9	0.4	Pass
FSK 250Kbps FHSS 902.5MHz~927.5MHz	250 ≤ 20dB Bandwidth < 500	10	304.3	0.4	Pass

### Figure 8: Channel Occupancy Time

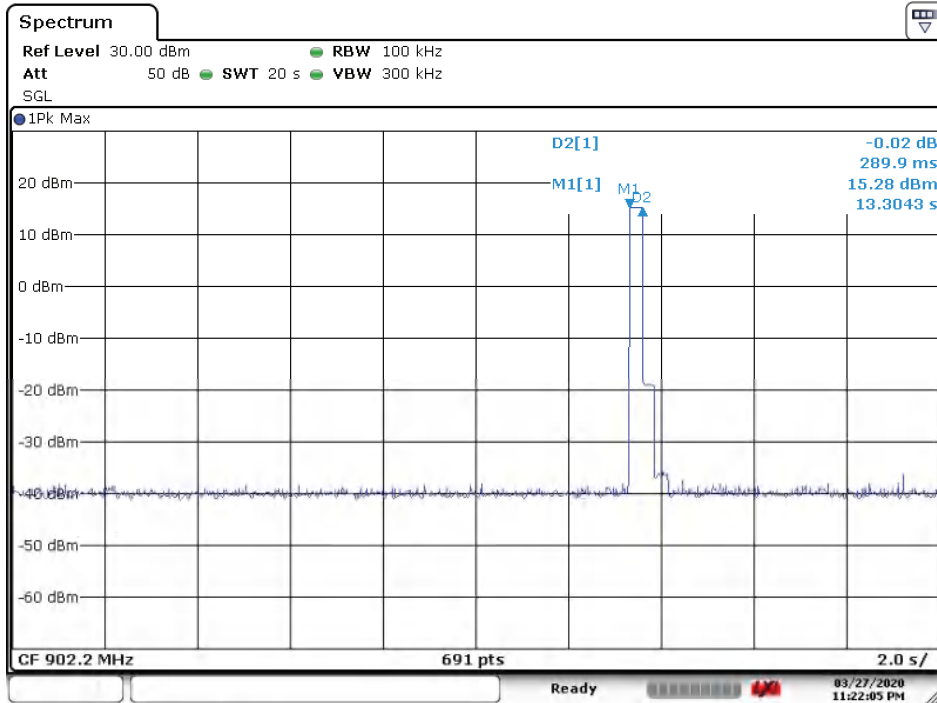
#### 1. LoRa 125kHz FHSS, 902.2MHz~927.8MHz



#### 2. FSK 150Kbps FHSS, 902.4MHz~927.6MHz

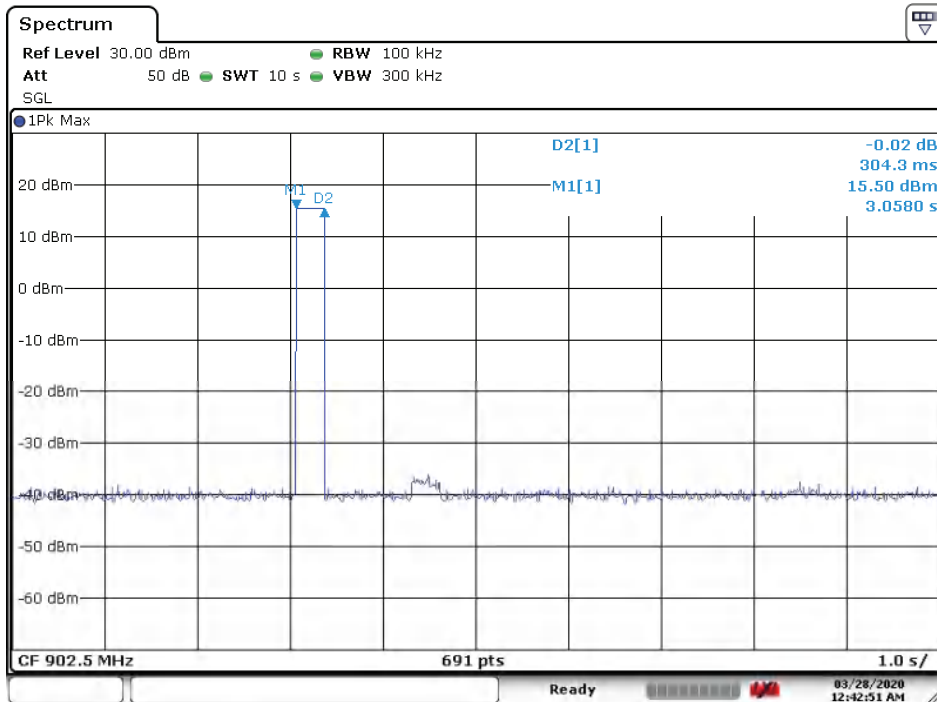


3. FSK 50Kbps FHSS, 902.2MHz~927.8MHz



Date: 27.MAR.2020 23:22:05

4. FSK 250Kbps FHSS, 902.5MHz~927.5MHz



Date: 28.MAR.2020 00:42:51

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#### 4.1.11 Conducted Emission (AC power-line)

**Result:**

N.A

Test Specification

Test standard

: FCC Part 15.207  
RSS-Gen Issue 5 March 2019 clause 8.8

Basic standard

: ANSI C63.10: 2013, clause 6.2

Port

: Mains

Frequency range

: 0.15 – 30MHz

Limits

: FCC part 15.207(a)  
RSS Gen Issue 5 March 2019, table 4

Kind of test site

: 3m Semi-anechoic Chamber

The EUT is supplied by battery and it cannot be connected to the public low-voltage distribution systems directly. Charging for battery is performed independently and without using EUT. Therefore, no disturbance voltage test is performed.



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### 4.1.12 Radiated Emission

**Result:**

**Pass**

Test Specification	
Test standard	: FCC Part 15.209 RSS-Gen Issue 5 March 2019
Basic standard	: ANSI C63.10: 2013, clause 6.3 KDB 558074 D01 v05r02, clause 8.6
Port	: Enclosure
Frequency range	: 30MHz-10 <sup>th</sup> Harmonic for intentional radiator
Limits	: FCC part 15.209(a) RSS Gen Issue 5 March 2019, table 3, table 5
Kind of test site	: 3m Semi-anechoic Chamber

#### Test Setup

Date of testing	: 23.03.2020-24.03.2020
Input voltage	: DC 4.5V
Operational mode	: Mode C
Test channel	: Lo, Mi, Hi
Temperature	: 22°C
Relative humidity	: 55%
Atmospheric pressure	: 101 kPa

**Remark:**

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case emissions configuration of the each mode were reported.

The measurement result is calculated based on the following formula by the test software:

Emission Level = Reading level + Correction (Antenna factor + Cable loss – Preamplifier)

**Table 9: BLE Mode C, Radiated Emission, below 1GHz, Horizontal, Channel 0**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.425000	21.45	40.00	18.55	1000.0	120.000	H	25.1
127.691111	15.41	43.50	28.09	1000.0	120.000	H	19.0
844.727778	25.04	46.00	20.96	1000.0	120.000	H	29.5

**Table 10: BLE Mode C, Radiated Emission, below 1GHz, Vertical, Channel 0**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.101111	20.99	40.00	19.01	1000.0	120.000	V	24.7
119.854444	15.68	43.50	27.82	1000.0	120.000	V	19.4
845.252778	25.08	46.00	20.92	1000.0	120.000	V	29.4

**Table 11: BLE Mode C, Radiated Emission, below 1GHz, Horizontal, Channel 19**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.068333	21.02	40.00	18.98	1000.0	120.000	H	24.7
728.207778	27.13	46.00	18.87	1000.0	120.000	H	28.0
846.071667	25.01	46.00	20.99	1000.0	120.000	H	29.4

**Table 12: BLE Mode C, Radiated Emission, below 1GHz, Vertical, Channel 19**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.200000	21.56	40.00	18.44	1000.0	120.000	V	25.2
121.203333	15.78	43.50	27.72	1000.0	120.000	V	19.3
729.188333	27.18	46.00	18.82	1000.0	120.000	V	28.1

**Table 13: BLE Mode C, Radiated Emission, below 1GHz, Horizontal, Channel 39**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.122222	20.93	40.00	19.07	1000.0	120.000	H	24.7
728.449444	27.12	46.00	18.88	1000.0	120.000	H	28.0
862.182778	24.94	46.00	21.06	1000.0	120.000	H	29.3

**Table 14: BLE Mode C, Radiated Emission, below 1GHz, Vertical, Channel 39**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.748333	21.25	40.00	18.75	1000.0	120.000	V	24.9
130.156111	15.41	43.50	28.09	1000.0	120.000	V	18.9
850.773889	24.92	46.00	21.08	1000.0	120.000	V	29.4

**Table 15: LoRa 500KHz DTS, 902.5~926.5 MHz, Mode C, Radiated Emission, Horizontal, CH 902.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr (dB)
32.151111	22.53	40.00	17.47	1000.0	120.000	H	24.2
124.134444	15.65	43.50	27.85	1000.0	120.000	H	19.2
846.290556	25.12	46.00	20.88	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3608.970000	46.3	1000.0	1000.000	H	-1.7	27.7	74.0
5413.625000	48.1	1000.0	1000.000	H	1.5	25.9	74.0
6316.220000	52.9	1000.0	1000.000	H	2.6	21.1	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3608.970000	42.3	1000.0	1000.000	H	-1.7	11.7	54.0
5413.625000	44.2	1000.0	1000.000	H	1.5	9.8	54.0
6316.220000	51.0	1000.0	1000.000	H	2.6	3.0	54.0

**Table 16: LoRa 500KHz DTS, 902.5~926.5 MHz, Mode C, Radiated Emission, Vertical, CH 902.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.003889	21.12	40.00	18.88	1000.0	120.000	V	24.8
122.074444	15.66	43.50	27.84	1000.0	120.000	V	19.3
845.345000	25.12	46.00	20.88	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
4815.970000	43.0	1000.0	1000.000	V	1.0	31.0	74.0
6316.220000	50.7	1000.0	1000.000	V	2.6	23.3	74.0
9254.030000	47.0	1000.0	1000.000	V	6.4	27.0	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
4815.970000	32.1	1000.0	1000.000	V	1.0	21.9	54.0
6316.220000	48.1	1000.0	1000.000	V	2.6	5.9	54.0
9254.030000	36.1	1000.0	1000.000	V	6.4	17.9	54.0

**Table 17: LoRa 500KHz DTS, 902.5~926.5 MHz, Mode C, Radiated Emission, Horizontal, CH 914.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.616111	21.31	40.00	18.69	1000.0	120.000	H	25.0
729.065000	27.21	46.00	18.79	1000.0	120.000	H	28.1
850.692222	25.05	46.00	20.95	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5487.470000	50.2	1000.0	1000.000	H	1.6	23.8	74.0
6402.280000	49.9	1000.0	1000.000	H	2.8	24.1	74.0
9147.250000	50.2	1000.0	1000.000	H	6.1	23.8	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5487.470000	47.1	1000.0	1000.000	H	1.6	6.9	54.0
6402.280000	46.3	1000.0	1000.000	H	2.8	7.7	54.0
9147.250000	45.4	1000.0	1000.000	H	6.1	8.6	54.0

**Table 18: LoRa 500KHz DTS, 902.5~926.5 MHz, Mode C, Radiated Emission, Vertical, CH 914.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.925556	21.23	40.00	18.77	1000.0	120.000	V	24.8
734.996111	25.88	46.00	20.12	1000.0	120.000	V	28.3
853.995000	25.00	46.00	21.00	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5485.875000	46.2	1000.0	1000.000	V	1.6	27.8	74.0
6401.750000	44.6	1000.0	1000.000	V	2.8	29.4	74.0
9264.125000	47.1	1000.0	1000.000	V	6.4	26.9	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5485.875000	40.7	1000.0	1000.000	V	1.6	13.3	54.0
6401.750000	36.6	1000.0	1000.000	V	2.8	17.4	54.0
9264.125000	36.2	1000.0	1000.000	V	6.4	17.8	54.0

**Table 19: LoRa 500KHz DTS, 902.5~926.5 MHz, Mode C, Radiated Emission, Horizontal, CH 926.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.398889	21.44	40.00	18.56	1000.0	120.000	H	25.1
708.833889	24.53	46.00	21.47	1000.0	120.000	H	27.8
846.313333	25.13	46.00	20.87	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5558.125000	51.7	1000.0	1000.000	H	1.7	22.3	74.0
6484.095000	51.0	1000.0	1000.000	H	3.1	23.0	74.0
8337.095000	51.0	1000.0	1000.000	H	5.7	23.0	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5558.125000	49.3	1000.0	1000.000	H	1.7	4.7	54.0
6484.095000	47.8	1000.0	1000.000	H	3.1	6.2	54.0
8337.095000	47.1	1000.0	1000.000	H	5.7	6.9	54.0

**Table 20: LoRa 500KHz DTS, 902.5~926.5 MHz, Mode C, Radiated Emission, Vertical, CH 926.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.506667	21.40	40.00	18.60	1000.0	120.000	V	25.0
729.186667	27.31	46.00	18.69	1000.0	120.000	V	28.1
844.863333	25.14	46.00	20.86	1000.0	120.000	V	29.5

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5559.185000	48.2	1000.0	1000.000	V	1.7	25.8	74.0
8339.220000	48.8	1000.0	1000.000	V	5.7	25.2	74.0
9266.780000	48.1	1000.0	1000.000	V	6.4	25.9	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5559.185000	44.3	1000.0	1000.000	V	1.7	9.7	54.0
8339.220000	42.7	1000.0	1000.000	V	5.7	11.3	54.0
9266.780000	39.3	1000.0	1000.000	V	6.4	14.7	54.0

**Table 21: LoRa 125KHz FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Horizontal, CH 902.2**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.318889	21.55	40.00	18.45	1000.0	120.000	H	25.1
728.447778	27.19	46.00	18.81	1000.0	120.000	H	28.0
845.953333	25.22	46.00	20.78	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3608.970000	47.2	1000.0	1000.000	H	-1.7	26.8	74.0
5413.095000	48.2	1000.0	1000.000	H	1.5	25.8	74.0
6315.685000	52.6	1000.0	1000.000	H	2.6	21.4	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3608.970000	43.4	1000.0	1000.000	H	-1.7	10.6	54.0
5413.095000	43.7	1000.0	1000.000	H	1.5	10.3	54.0
6315.685000	50.4	1000.0	1000.000	H	2.6	3.6	54.0

**Table 22: LoRa 125KHz FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Vertical, CH 902.2**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.515556	21.42	40.00	18.58	1000.0	120.000	V	25.0
134.121111	15.22	43.50	28.28	1000.0	120.000	V	18.7
845.941111	25.09	46.00	20.91	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
4428.685000	42.6	1000.0	1000.000	V	0.7	31.4	74.0
6315.155000	51.1	1000.0	1000.000	V	2.6	22.9	74.0
9405.435000	45.8	1000.0	1000.000	V	6.4	28.2	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
4428.685000	32.1	1000.0	1000.000	V	0.7	21.9	54.0
6315.155000	48.1	1000.0	1000.000	V	2.6	5.9	54.0
9405.435000	35.3	1000.0	1000.000	V	6.4	18.7	54.0

**Table 23: LoRa 125KHz FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Horizontal, CH 915**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.200000	21.51	40.00	18.49	1000.0	120.000	H	25.2
122.143889	15.56	43.50	27.94	1000.0	120.000	H	19.3
846.355000	24.91	46.00	21.09	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3659.435000	44.9	1000.0	1000.000	H	-1.4	29.1	74.0
5489.595000	48.3	1000.0	1000.000	H	1.6	25.7	74.0
6405.470000	51.0	1000.0	1000.000	H	2.8	23.0	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3659.435000	39.7	1000.0	1000.000	H	-1.4	14.3	54.0
5489.595000	44.5	1000.0	1000.000	H	1.6	9.5	54.0
6405.470000	48.0	1000.0	1000.000	H	2.8	6.0	54.0

**Table 24: LoRa 125KHz FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Vertical, CH 915**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.545000	21.32	40.00	18.68	1000.0	120.000	V	25.0
128.155000	15.39	43.50	28.11	1000.0	120.000	V	19.0
845.991667	25.09	46.00	20.91	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
4363.875000	43.5	1000.0	1000.000	V	1.1	30.5	74.0
6404.935000	48.1	1000.0	1000.000	V	2.8	25.9	74.0
9275.810000	46.8	1000.0	1000.000	V	6.4	27.2	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
4363.875000	32.6	1000.0	1000.000	V	1.1	21.4	54.0
6404.935000	43.2	1000.0	1000.000	V	2.8	10.8	54.0
9275.810000	36.0	1000.0	1000.000	V	6.4	18.0	54.0

**Table 25: LoRa 125KHz FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Horizontal, CH 927.8**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.562222	21.37	40.00	18.63	1000.0	120.000	H	25.0
728.647778	27.12	46.00	18.88	1000.0	120.000	H	28.1
845.774444	25.18	46.00	20.82	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5566.625000	49.3	1000.0	1000.000	H	1.7	24.7	74.0
6494.720000	53.2	1000.0	1000.000	H	3.1	20.8	74.0
9277.405000	49.6	1000.0	1000.000	H	6.4	24.4	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5566.625000	45.7	1000.0	1000.000	H	1.7	8.3	54.0
6494.720000	50.8	1000.0	1000.000	H	3.1	3.2	54.0
9277.405000	41.7	1000.0	1000.000	H	6.4	12.3	54.0

**Table 26: LoRa 125KHz FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Vertical, CH 927.8**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.150000	21.00	40.00	19.00	1000.0	120.000	V	24.7
119.701667	15.72	43.50	27.78	1000.0	120.000	V	19.4
844.997222	25.10	46.00	20.90	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
4288.970000	43.6	1000.0	1000.000	V	1.1	30.4	74.0
6495.250000	47.6	1000.0	1000.000	V	3.1	26.4	74.0
9655.125000	45.7	1000.0	1000.000	V	6.3	28.3	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
4288.970000	32.8	1000.0	1000.000	V	1.1	21.2	54.0
6495.250000	42.7	1000.0	1000.000	V	3.1	11.3	54.0



**Table 27: FSK 150Kbps FHSS, 902.4~927.6MHz, Mode C, Radiated Emission, Horizontal, CH 902.4**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.750000	21.18	40.00	18.82	1000.0	120.000	H	24.9
728.677222	27.30	46.00	18.70	1000.0	120.000	H	28.1
845.169444	25.07	46.00	20.93	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5414.685000	47.6	1000.0	1000.000	H	1.5	26.4	74.0
6316.750000	55.2	1000.0	1000.000	H	2.6	18.8	74.0
9328.405000	46.7	1000.0	1000.000	H	6.4	27.3	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5414.685000	42.9	1000.0	1000.000	H	1.5	11.1	54.0
6316.750000	53.4	1000.0	1000.000	H	2.6	0.6	54.0
9328.405000	35.7	1000.0	1000.000	H	6.4	18.3	54.0

**Table 28: FSK 150Kbps FHSS, 902.4~927.6MHz, Mode C, Radiated Emission, Vertical, CH 902.4**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.368889	20.81	40.00	19.19	1000.0	120.000	V	24.6
729.174444	27.27	46.00	18.73	1000.0	120.000	V	28.1
845.129444	25.14	46.00	20.86	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
4302.780000	43.6	1000.0	1000.000	V	1.1	30.4	74.0
6316.750000	53.0	1000.0	1000.000	V	2.6	21.0	74.0
9184.435000	46.0	1000.0	1000.000	V	6.2	28.0	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
4302.780000	32.9	1000.0	1000.000	V	1.1	21.1	54.0
6316.750000	50.7	1000.0	1000.000	V	2.6	3.3	54.0
9184.435000	35.3	1000.0	1000.000	V	6.2	18.7	54.0

**Table 29: FSK 150Kbps FHSS, 902.4~927.6MHz, Mode C, Radiated Emission, Horizontal, CH 914.8**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.852778	21.12	40.00	18.88	1000.0	120.000	H	24.9
145.399444	14.77	43.50	28.73	1000.0	120.000	H	18.0
844.997222	25.09	46.00	20.91	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3658.905000	46.1	1000.0	1000.000	H	-1.4	27.9	74.0
5488.530000	50.4	1000.0	1000.000	H	1.6	23.6	74.0
8234.030000	47.5	1000.0	1000.000	H	5.6	26.5	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3658.905000	41.0	1000.0	1000.000	H	-1.4	13.0	54.0
5488.530000	47.3	1000.0	1000.000	H	1.6	6.7	54.0
8234.030000	40.2	1000.0	1000.000	H	5.6	13.8	54.0

**Table 30: FSK 150Kbps FHSS, 902.4~927.6MHz, Mode C, Radiated Emission, Vertical, CH 914.8**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.452778	21.47	40.00	18.53	1000.0	120.000	V	25.1
144.328889	14.76	43.50	28.74	1000.0	120.000	V	18.0
709.668333	24.46	46.00	21.54	1000.0	120.000	V	27.8

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5489.060000	45.0	1000.0	1000.000	V	1.6	29.0	74.0
8581.470000	46.7	1000.0	1000.000	V	5.8	27.3	74.0
9188.155000	45.6	1000.0	1000.000	V	6.2	28.4	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5489.060000	36.7	1000.0	1000.000	V	1.6	17.3	54.0
8581.470000	35.0	1000.0	1000.000	V	5.8	19.0	54.0
9188.155000	35.2	1000.0	1000.000	V	6.2	18.8	54.0

**Table 31: FSK 150Kbps FHSS, 902.4~927.6MHz, Mode C, Radiated Emission, Horizontal, CH 927.6**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.520556	21.41	40.00	18.59	1000.0	120.000	H	25.0
711.349444	24.52	46.00	21.48	1000.0	120.000	H	27.8
848.527778	25.04	46.00	20.96	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
6493.125000	52.8	1000.0	1000.000	H	3.1	21.2	74.0
8348.780000	51.6	1000.0	1000.000	H	5.7	22.4	74.0
9276.345000	52.7	1000.0	1000.000	H	6.4	21.3	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
6493.125000	50.1	1000.0	1000.000	H	3.1	3.9	54.0
8348.780000	48.2	1000.0	1000.000	H	5.7	5.8	54.0
9276.345000	48.9	1000.0	1000.000	H	6.4	5.1	54.0

**Table 32: FSK 150Kbps FHSS, 902.4~927.6MHz, Mode C, Radiated Emission, Vertical, CH 927.6**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.885556	21.15	40.00	18.85	1000.0	120.000	V	24.8
126.964444	15.54	43.50	27.96	1000.0	120.000	V	19.1
846.355000	25.13	46.00	20.87	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5565.030000	47.7	1000.0	1000.000	V	1.7	26.3	74.0
6493.125000	48.2	1000.0	1000.000	V	3.1	25.8	74.0
9276.345000	48.0	1000.0	1000.000	V	6.4	26.0	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5565.030000	43.3	1000.0	1000.000	V	1.7	10.7	54.0
6493.125000	43.2	1000.0	1000.000	V	3.1	10.8	54.0
9276.345000	38.2	1000.0	1000.000	V	6.4	15.8	54.0

**Table 33: FSK 50Kbps FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Horizontal, CH 902.2**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.612222	22.88	40.00	17.12	1000.0	120.000	H	24.5
109.587778	15.21	43.50	28.29	1000.0	120.000	H	18.9
729.487222	27.24	46.00	18.76	1000.0	120.000	H	28.1

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3608.970000	46.2	1000.0	1000.000	H	-1.7	27.8	74.0
5413.625000	46.5	1000.0	1000.000	H	1.5	27.5	74.0
6315.155000	54.1	1000.0	1000.000	H	2.6	19.9	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3608.970000	40.2	1000.0	1000.000	H	-1.7	13.8	54.0
5413.625000	40.3	1000.0	1000.000	H	1.5	13.7	54.0
6315.155000	52.3	1000.0	1000.000	H	2.6	1.7	54.0

**Table 34: FSK 50Kbps FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Vertical, CH 902.2**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.177778	20.94	40.00	19.06	1000.0	120.000	V	24.7
130.536667	15.53	43.50	27.97	1000.0	120.000	V	18.9
710.085556	24.45	46.00	21.55	1000.0	120.000	V	27.8

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
4278.345000	43.0	1000.0	1000.000	V	1.0	31.0	74.0
6315.155000	53.1	1000.0	1000.000	V	2.6	20.9	74.0
9778.375000	46.2	1000.0	1000.000	V	6.4	27.8	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
4278.345000	32.3	1000.0	1000.000	V	1.0	21.7	54.0
6315.155000	50.9	1000.0	1000.000	V	2.6	3.1	54.0
9778.375000	35.5	1000.0	1000.000	V	6.4	18.5	54.0

**Table 35: FSK 50Kbps FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Horizontal, CH 915**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
31.288889	20.90	40.00	19.10	1000.0	120.000	H	24.6
137.905556	15.01	43.50	28.49	1000.0	120.000	H	18.4
900.176111	25.94	46.00	20.06	1000.0	120.000	H	29.9

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5490.125000	49.2	1000.0	1000.000	H	1.6	24.8	74.0
6404.405000	49.5	1000.0	1000.000	H	2.8	24.5	74.0
8234.560000	49.3	1000.0	1000.000	H	5.6	24.7	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5490.125000	45.4	1000.0	1000.000	H	1.6	8.6	54.0
6404.405000	45.2	1000.0	1000.000	H	2.8	8.8	54.0
8234.560000	43.7	1000.0	1000.000	H	5.6	10.3	54.0

**Table 36: FSK 50Kbps FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Vertical, CH 915**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
33.305556	21.78	40.00	18.22	1000.0	120.000	V	23.5
714.973889	24.61	46.00	21.39	1000.0	120.000	V	27.8
859.776667	24.98	46.00	21.02	1000.0	120.000	V	29.3

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
6404.935000	44.8	1000.0	1000.000	V	2.8	29.2	74.0
7992.310000	45.6	1000.0	1000.000	V	5.1	28.4	74.0
9861.780000	45.4	1000.0	1000.000	V	6.5	28.6	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
6404.935000	36.5	1000.0	1000.000	V	2.8	17.5	54.0
7992.310000	34.9	1000.0	1000.000	V	5.1	19.1	54.0
9861.780000	35.1	1000.0	1000.000	V	6.5	18.9	54.0

**Table 37: FSK 50Kbps FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Horizontal, CH 927.8**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.656111	21.24	40.00	18.76	1000.0	120.000	H	25.0
711.617222	24.45	46.00	21.55	1000.0	120.000	H	27.8

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5566.625000	51.8	1000.0	1000.000	H	1.7	22.2	74.0
6494.185000	52.4	1000.0	1000.000	H	3.1	21.6	74.0
9278.470000	51.6	1000.0	1000.000	H	6.4	22.4	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5566.625000	49.5	1000.0	1000.000	H	1.7	4.5	54.0
6494.185000	50.1	1000.0	1000.000	H	3.1	3.9	54.0
9278.470000	47.3	1000.0	1000.000	H	6.4	6.7	54.0

**Table 38: FSK 50Kbps FHSS, 902.2~927.8MHz, Mode C, Radiated Emission, Vertical, CH 927.8**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.734444	21.25	40.00	18.75	1000.0	120.000	V	24.9
714.528889	24.48	46.00	21.52	1000.0	120.000	V	27.8
845.225000	25.06	46.00	20.94	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5567.155000	47.8	1000.0	1000.000	V	1.7	26.2	74.0
6494.720000	47.8	1000.0	1000.000	V	3.1	26.2	74.0
8349.845000	49.2	1000.0	1000.000	V	5.7	24.8	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5567.155000	43.9	1000.0	1000.000	V	1.7	10.1	54.0
6494.720000	42.2	1000.0	1000.000	V	3.1	11.8	54.0
8349.845000	43.8	1000.0	1000.000	V	5.7	10.3	54.0

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**Table 39: FSK 250Kbps FHSS, 902.5~927.5MHz, Mode C, Radiated Emission, Horizontal, CH 902.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.480556	21.33	40.00	18.67	1000.0	120.000	H	25.0
709.785000	24.38	46.00	21.62	1000.0	120.000	H	27.8
845.021667	25.08	46.00	20.92	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3610.030000	46.4	1000.0	1000.000	H	-1.7	27.6	74.0
5415.220000	46.9	1000.0	1000.000	H	1.5	27.1	74.0
6317.280000	54.3	1000.0	1000.000	H	2.6	19.7	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3610.030000	41.5	1000.0	1000.000	H	-1.7	12.5	54.0
5415.220000	41.7	1000.0	1000.000	H	1.5	12.3	54.0
6317.280000	51.8	1000.0	1000.000	H	2.6	2.2	54.0

**Table 40: FSK 250Kbps FHSS, 902.5~927.5MHz, Mode C, Radiated Emission, Vertical, CH 902.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.680556	21.29	40.00	18.71	1000.0	120.000	V	24.9
729.360556	27.35	46.00	18.65	1000.0	120.000	V	28.1
845.643889	25.14	46.00	20.86	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
3609.500000	45.0	1000.0	1000.000	V	-1.7	29.0	74.0
5415.220000	46.9	1000.0	1000.000	V	1.5	27.1	74.0
6317.280000	54.4	1000.0	1000.000	V	2.6	19.6	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
3609.500000	39.8	1000.0	1000.000	V	-1.7	14.2	54.0
5415.220000	41.8	1000.0	1000.000	V	1.5	12.2	54.0
6317.280000	51.9	1000.0	1000.000	V	2.6	2.1	54.0

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**Table 41: FSK 250Kbps FHSS, 902.5~927.5MHz, Mode C, Radiated Emission, Horizontal, CH 915**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.710000	21.26	40.00	18.74	1000.0	120.000	H	24.9
729.541111	27.33	46.00	18.67	1000.0	120.000	H	28.1
848.392222	25.12	46.00	20.88	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5489.595000	50.9	1000.0	1000.000	H	1.6	23.1	74.0
6404.935000	53.9	1000.0	1000.000	H	2.8	20.1	74.0
8235.625000	52.0	1000.0	1000.000	H	5.6	22.0	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5489.595000	47.6	1000.0	1000.000	H	1.6	6.4	54.0
6404.935000	51.6	1000.0	1000.000	H	2.8	2.4	54.0
8235.625000	48.5	1000.0	1000.000	H	5.6	5.5	54.0

**Table 42: FSK 250Kbps FHSS, 902.5~927.5MHz, Mode C, Radiated Emission, Vertical, CH 915**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.223333	21.59	40.00	18.41	1000.0	120.000	V	25.2
709.007778	24.42	46.00	21.58	1000.0	120.000	V	27.8
845.779444	25.02	46.00	20.98	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
6404.935000	50.7	1000.0	1000.000	V	2.8	23.3	74.0
8235.095000	50.8	1000.0	1000.000	V	5.6	23.2	74.0
9318.845000	47.5	1000.0	1000.000	V	6.4	26.5	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
6404.935000	46.8	1000.0	1000.000	V	2.8	7.2	54.0
8235.095000	45.4	1000.0	1000.000	V	5.6	8.6	54.0
9318.845000	36.6	1000.0	1000.000	V	6.4	17.4	54.0



**Table 43: FSK 250Kbps FHSS, 902.5~927.5MHz, Mode C, Radiated Emission, Horizontal, CH 927.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.600556	21.28	40.00	18.72	1000.0	120.000	H	25.0
728.823333	27.18	46.00	18.82	1000.0	120.000	H	28.1
845.505000	25.05	46.00	20.95	1000.0	120.000	H	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5565.030000	52.8	1000.0	1000.000	H	1.7	21.2	74.0
6492.060000	55.0	1000.0	1000.000	H	3.1	19.0	74.0
9274.750000	53.6	1000.0	1000.000	H	6.4	20.4	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5565.030000	50.1	1000.0	1000.000	H	1.7	3.9	54.0
6492.060000	53.0	1000.0	1000.000	H	3.1	1.0	54.0
9274.750000	48.8	1000.0	1000.000	H	6.4	5.2	54.0

**Table 44: FSK 250Kbps FHSS, 902.5~927.5MHz, Mode C, Radiated Emission, Vertical, CH 927.5**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)
30.777778	21.12	40.00	18.88	1000.0	120.000	V	24.9
729.011111	27.09	46.00	18.91	1000.0	120.000	V	28.1
846.231667	25.03	46.00	20.97	1000.0	120.000	V	29.4

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
5565.030000	48.3	1000.0	1000.000	V	1.7	25.7	74.0
6492.595000	49.2	1000.0	1000.000	V	3.1	24.8	74.0
8347.720000	48.8	1000.0	1000.000	V	5.7	25.2	74.0

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
5565.030000	43.4	1000.0	1000.000	V	1.7	10.6	54.0
6492.595000	45.0	1000.0	1000.000	V	3.1	9.0	54.0
8347.720000	42.1	1000.0	1000.000	V	5.7	11.9	54.0