

FCC Test Report

Product Name	Radio Identification Device
Model No.	IDGNG1M
FCC ID.	NBGIDGNG1M

Applicant	HELLA GmbH & Co. KGaA
Address	Rixbecker Strasse 75, 59552 Lippstadt, Germany

Date of Receipt	Dec. 18, 2017
Issued Date	Mar. 31, 2018
Report No.	17C0218R-RFUSP14V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Test Report

Issued Date: Mar. 31, 2018

Report No.: 17C0218R-RFUSP14V00



Product Name	Radio Identification Device
Applicant	HELLA GmbH & Co. KGaA
Address	Rixbecker Strasse 75, 59552 Lippstadt, Germany
Manufacturer	HELLA GmbH & Co. KGaA
Factory	1.HELLA GmbH & Co. KGaA 2.Hella Shanghai Electronics Co. Ltd (HSE)
Address	1.Römerstr. 66, 59075 Hamm 2.No. 411 Jianye Road, Pudong, Shanghai 201201, China
Model No.	IDGNG1M
FCC ID.	NBGIDGNG1M
EUT Rated Voltage	DC 3V (Power by Battery)
EUT Test Voltage	DC 3V (Power by Battery)
Trade Name	HELLA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Jinn Chen
(Senior Adm. Specialist / Jinn Chen)

Tested By : Nova chu
(Engineer / Nova Chu)

Approved By : 
(Director / Vincent Lin)

TABLE OF CONTENTS

Description	Page
1. General Information	4
1.1. EUT Description.....	4
1.2. Operation Description	4
1.3. Tested System Details.....	5
1.4. Configuration of tested System	5
1.5. EUT Exercise Software	5
1.6. Test Facility	6
1.7. List of Test Equipment	7
2. Conducted Emission.....	8
2.1. Test Setup	8
2.2. Limits	8
2.3. Test Procedure	9
2.4. Uncertainty	9
2.5. Test Result	10
3. Radiated Emission	11
3.1. Test Setup	11
3.2. Limits	12
3.3. Test Procedure	13
3.4. Uncertainty	13
3.5. Test Result	14
4. Transmit time.....	26
4.1. Test Setup	26
4.2. Limits	26
4.3. Uncertainty	26
4.4. Test Result	27
5. Occupied Bandwidth.....	29
5.1. Test Setup	29
5.2. Limits	29
5.3. Uncertainty	29
5.4. Test Result	30

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. General Information

1.1. EUT Description

Product Name	Radio Identification Device
Trade Name	HELLA
Model No.	IDGNG1M
FCC ID	NBGIDGNG1M
Frequency Range	433.2 MHz, 434.64 MHz
Number of Channels	2
Type of Modulation	FSK
Antenna Type	PCB loop antenna

Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 1:	433.2 MHz	Channel 2:	434.64 MHz

Note:

1. The EUT is a Radio Identification Device with a built-in 433.2 MHz, 434.62 MHz transceiver.
2. The antenna of EUT is conform to FCC 15.203
3. These tests are conducted on a sample for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
-----------	------------------

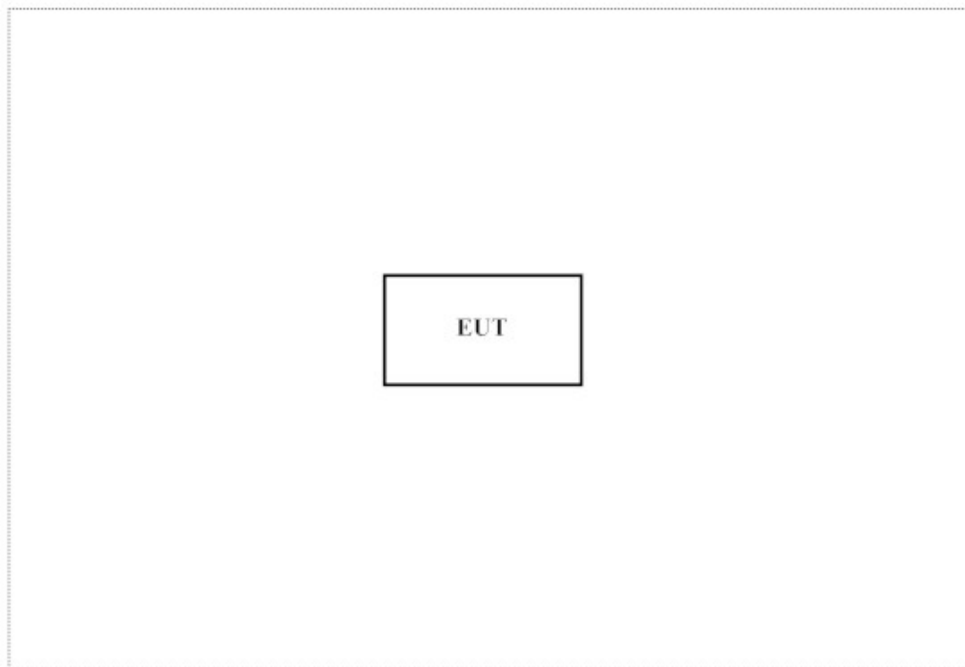
1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
N/A					

Signal Cable Type	Signal cable Description
N/A	

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in section 1.4.
2	Push the button, start transmit continually.
3	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Corporation's Web Site: <http://www.dekra.com.tw/chinese/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Corporation's laboratories can be founded in our Web site: <http://www.dekra.com.tw>

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd.
Site Address: No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW0023

1.7. List of Test Equipment

For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2018.02.08	2019.02.07
X	Two-Line V-Network	R&S	ENV216	101306	2018.03.09	2019.03.08
X	Two-Line V-Network	R&S	ENV216	101307	2018.03.20	2019.03.19
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2017.05.24	2018.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

For Conducted measurements /ASR4

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2018.01.23	2019.01.22
X	Power Meter	Anritsu	ML2496A	1548003	2017.12.11	2018.12.10
X	Power Sensor	Anritsu	MA2411B	1531024	2017.12.11	2018.12.10
X	Power Sensor	Anritsu	MA2411B	1531025	2017.12.11	2018.12.10
	Bluetooth Tester	R&S	CBT	101238	2018.01.18	2019.01.17

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek Conduction Test System V8.0.110

For Radiated measurements /ACB1

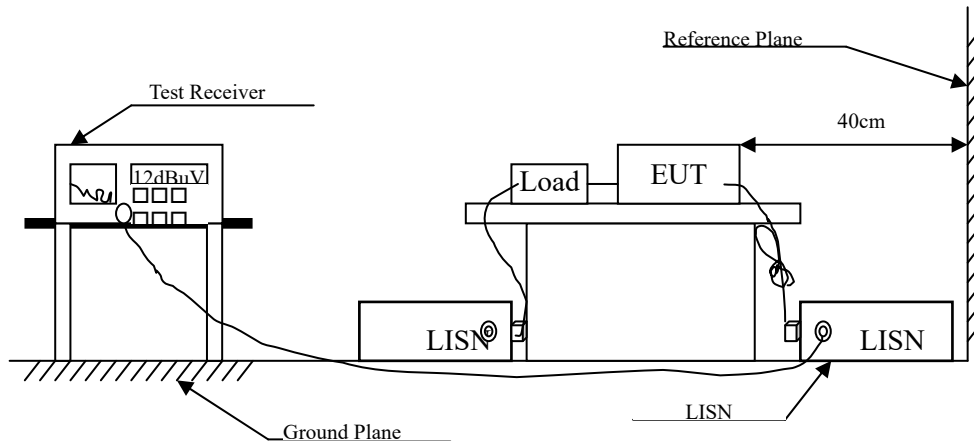
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2018.01.26	2019.01.25
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2017.06.01	2018.05.31
X	Horn Antenna	ETS-Lindgren	3117	00203800	2017.11.10	2018.11.09
X	Horn Antenna	Com-Power	AH-840	101087	2017.05.24	2018.05.23
X	Pre-Amplifier	EMCI	EMC001330	980316	2017.05.16	2018.05.15
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2017.05.17	2018.05.16
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2017.05.17	2018.05.16
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2017.05.17	2018.05.16
X	Filter	MICRO TRONICS	BRM50702	G251	2017.08.30	2018.08.29
	Filter	MICRO TRONICS	BRM50716	G188	2017.08.30	2018.08.29
X	EMI Test Receiver	R&S	ESR7	101602	2017.12.11	2018.12.10
X	Spectrum Analyzer	R&S	FSV40	101149	2018.02.08	2019.02.07
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2017.05.25	2018.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2017.08.11	2018.08.10

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Uncertainty

$\pm 2.35\text{dB}$

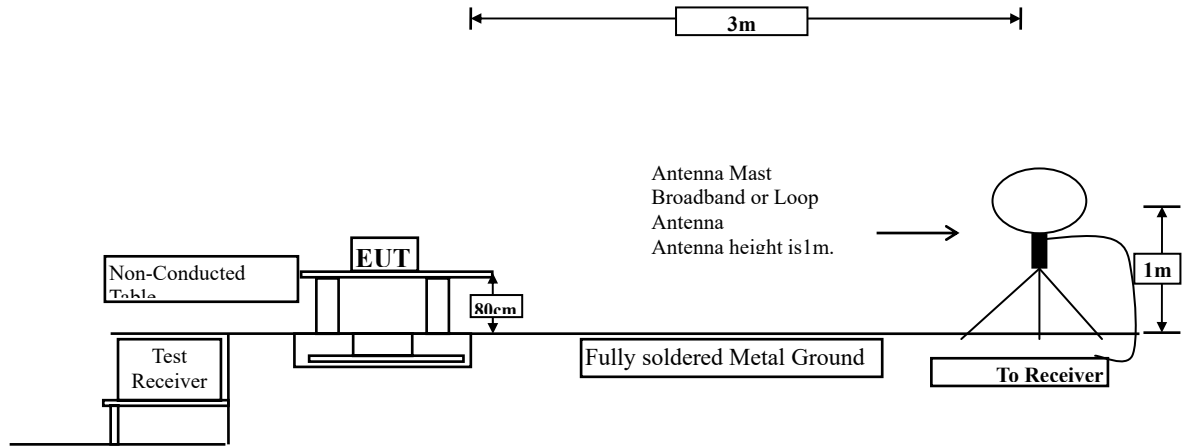
2.5. Test Result

Owing to the DC operation of EUT, this test item is not performed.

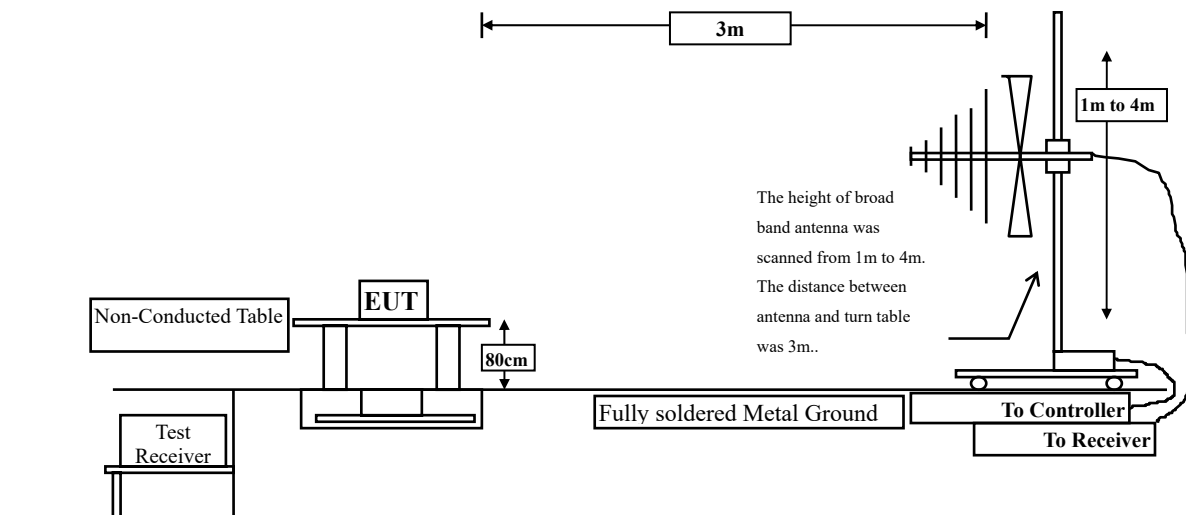
3. Radiated Emission

3.1. Test Setup

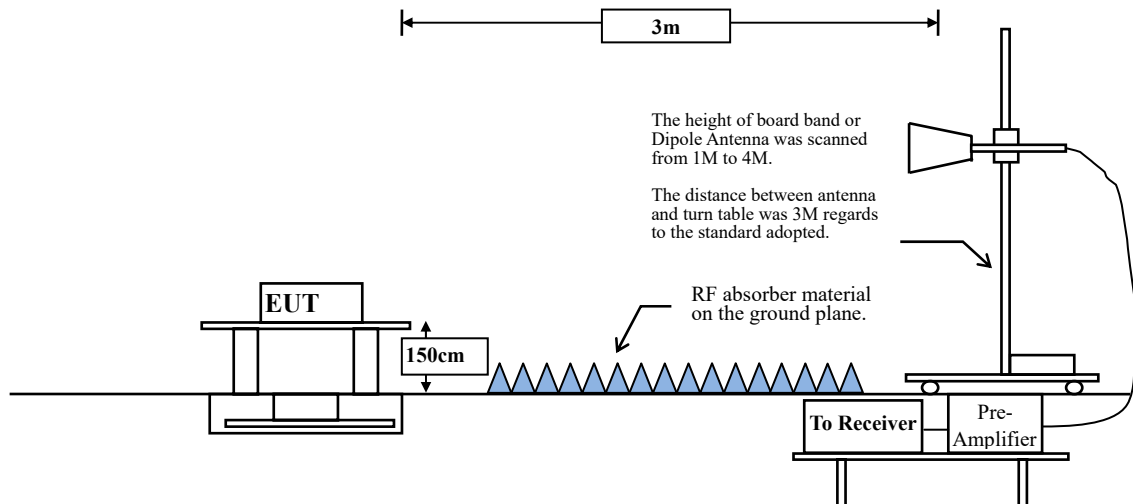
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

Fundamental Frequency MHz	Field Strength of Fundamental	Field Strength of Spurious Emission
40.66-40.70	2250	225
70-130	1250	125
130-174	1250-3750	125-375
174-260	3750	375
260-470	3750-12500	375-1250
above 470	12500	1250

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10, 2013 on radiated measurement.

On the field strength of fundamental and harmonics, the limits shown are based on measuring equipment employing an average detector function. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

On the field strength of spurious electric, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function.

When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

3.4. Uncertainty

Horizontal polarization :

30-300MHz: ± 4.08 dB ; 300M-1GHz: ± 3.86 dB ; 1-18GHz: ± 3.77 dB ; 18-40GHz: ± 3.98 dB

Vertical polarization :

30-300MHz: ± 4.81 dB ; 300M-1GHz: ± 3.87 dB ; 1-18GHz: ± 3.83 dB ; 18-40GHz: ± 3.98 dB

3.5. Test Result

Product	Radio Identification Device
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (433.2 MHz)
Date of Test	2018/01/10

Fundamental Power (X-Line)

Peak Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

433.200	-6.569	83.270	76.700	-24.100	100.801
---------	--------	--------	--------	---------	---------

Vertical

433.200	-6.569	66.580	60.010	-40.790	100.801
---------	--------	--------	--------	---------	---------

Average Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

433.200	-6.569	76.200	69.630	-11.170	80.801
---------	--------	--------	--------	---------	--------

Vertical

433.200	-6.569	59.200	52.630	-28.170	80.801
---------	--------	--------	--------	---------	--------

Note:

1. Measurement Level = Reading Level + Correct Factor
2. Average Limit=20log(10966.68114)=80.801 dBuV 、 Peak Limit=100.801 dBuV

Product	Radio Identification Device
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (433.2 MHz)
Date of Test	2018/01/10

Fundamental Power (Y-Line)

Peak Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

433.200	-6.569	79.090	72.520	-28.280	100.801
---------	--------	--------	--------	---------	---------

Vertical

433.200	-6.569	84.640	78.070	-22.730	100.801
---------	--------	--------	--------	---------	---------

Average Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

433.200	-6.569	72.000	65.430	-15.370	80.801
---------	--------	--------	--------	---------	--------

Vertical

433.200	-6.569	77.500	70.930	-9.870	80.801
---------	--------	--------	--------	--------	--------

Note:

1. Measurement Level = Reading Level + Correct Factor
2. Average Limit=20log(10966.68114)=80.801 dBuV 、 Peak Limit=100.801 dBuV

Product	Radio Identification Device
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (433.2 MHz)
Date of Test	2018/01/10

Fundamental Power (Z-Line)

Peak Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

433.200	-6.569	78.890	72.320	-28.480	100.801
---------	--------	--------	--------	---------	---------

Vertical

433.200	-6.569	84.840	78.270	-22.530	100.801
---------	--------	--------	--------	---------	---------

Average Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

433.200	-6.569	71.800	65.230	-15.570	80.801
---------	--------	--------	--------	---------	--------

Vertical

433.200	-6.569	77.700	71.130	-9.670	80.801
---------	--------	--------	--------	--------	--------

Note:

1. Measurement Level = Reading Level + Correct Factor
2. Average Limit=20log(10966.68114)=80.801 dBuV 、 Peak Limit=100.01 dBuV

Product	Radio Identification Device
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (434.64 MHz)
Date of Test	2018/01/15

Fundamental Power (X-Line)

Peak Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

434.640	-6.536	82.500	75.964	-24.876	100.848
---------	--------	--------	--------	---------	---------

Vertical

434.640	-6.536	65.900	59.364	-41.476	100.848
---------	--------	--------	--------	---------	---------

Average Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

434.640	-6.536	62.400	55.864	-24.976	80.848
---------	--------	--------	--------	---------	--------

Vertical

434.640	-6.536	45.900	39.364	-41.476	80.848
---------	--------	--------	--------	---------	--------

Note:

1. Measurement Level = Reading Level + Correct Factor
2. Average Limit=20log(11026.681188)=80.848 dBuV 、 Peak Limit=100.848 dBuV

Product	Radio Identification Device
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (434.64 MHz)
Date of Test	2018/01/15

Fundamental Power (Y-Line)

Peak Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

434.640	-6.536	67.700	61.164	-39.676	100.848
---------	--------	--------	--------	---------	---------

Vertical

434.640	-6.536	81.700	75.164	-25.676	100.848
---------	--------	--------	--------	---------	---------

Average Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

434.640	-6.536	47.700	41.164	-39.676	80.848
---------	--------	--------	--------	---------	--------

Vertical

434.640	-6.536	61.500	54.964	-25.876	80.848
---------	--------	--------	--------	---------	--------

Note:

1. Measurement Level = Reading Level + Correct Factor
2. Average Limit=20log(11026.681188)=80.848 dBuV 、 Peak Limit=100.848 dBuV

Product	Radio Identification Device
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (434.64 MHz)
Date of Test	2018/01/15

Fundamental Power (Z-Line)

Peak Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

434.640	-6.536	76.800	70.264	-30.576	100.848
---------	--------	--------	--------	---------	---------

Vertical

434.640	-6.536	82.900	76.364	-24.476	100.848
---------	--------	--------	--------	---------	---------

Average Detector:

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Horizontal

434.640	-6.536	56.700	50.164	-30.676	80.848
---------	--------	--------	--------	---------	--------

Vertical

434.640	-6.536	62.700	56.164	-24.676	80.848
---------	--------	--------	--------	---------	--------

Note:

1. Measurement Level = Reading Level + Correct Factor
2. Average Limit=20log(11026.681188)=80.848 dBuV 、 Peak Limit=100.848 dBuV

Product	Radio Identification Device
Test Item	Harmonic Radiated Emission
Test Mode	Mode 1: Transmit (433.2 MHz)
Date of Test	2017/12/30

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak					
1299.600	-0.540	46.380	45.840	-28.160	74.000
1732.800	1.203	46.860	48.063	-25.937	74.000
2166.000	3.252	46.390	49.642	-24.358	74.000
2599.200	3.839	46.390	50.229	-23.771	74.000
3032.400	4.327	46.500	50.827	-23.173	74.000
3465.600	4.413	46.360	50.773	-23.227	74.000
3898.800	4.659	46.580	51.239	-22.761	74.000
4332.000	5.450	47.500	52.950	-21.050	74.000
Average					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	Radio Identification Device
Test Item	Harmonic Radiated Emission
Test Mode	Mode 1: Transmit (433.2 MHz)
Date of Test	2017/12/30

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak					
1299.600	-0.540	46.710	46.170	-27.830	74.000
1732.800	1.203	46.820	48.023	-25.977	74.000
2166.000	3.252	47.020	50.272	-23.728	74.000
2599.200	3.839	47.220	51.059	-22.941	74.000
3032.400	4.327	46.200	50.527	-23.473	74.000
3465.600	4.413	46.110	50.523	-23.477	74.000
3898.800	4.659	46.470	51.129	-22.871	74.000
4332.000	5.450	46.980	52.430	-21.570	74.000
Average					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	Radio Identification Device
Test Item	Harmonic Radiated Emission
Test Mode	Mode 1: Transmit (434.64 MHz)
Date of Test	2018/01/16

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak					
1303.920	-12.783	50.790	38.007	-35.993	74.000
1738.560	-11.307	51.330	40.023	-33.977	74.000
2173.200	-9.426	51.720	42.294	-31.706	74.000
2607.840	-8.466	52.420	43.954	-30.046	74.000
3042.480	-8.154	51.750	43.596	-30.404	74.000
3477.120	-7.739	51.590	43.851	-30.149	74.000
3911.760	-7.266	52.450	45.184	-28.816	74.000
4346.400	-6.770	52.300	45.530	-28.470	74.000
Average					
--					54.000

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	Radio Identification Device
Test Item	Harmonic Radiated Emission
Test Mode	Mode 1: Transmit (434.64 MHz)
Date of Test	2018/01/16

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak					
1303.920	-12.783	51.360	38.577	-35.423	74.000
1738.560	-11.307	51.850	40.543	-33.457	74.000
2173.200	-9.426	51.870	42.444	-31.556	74.000
2607.840	-8.466	51.730	43.264	-30.736	74.000
3042.480	-8.154	51.660	43.506	-30.494	74.000
3477.120	-7.739	52.340	44.601	-29.399	74.000
3911.760	-7.266	52.530	45.264	-28.736	74.000
4346.400	-6.770	52.270	45.500	-28.500	74.000
Average					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	Radio Identification Device
Test Item	General Radiated Emission
Test Mode	Mode 1: Transmit (433.2 MHz)
Date of Test	2017/12/27

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Quasi-Peak					
162.145	-10.521	29.762	19.240	-24.260	43.500
381.449	-7.862	30.833	22.971	-23.029	46.000
544.522	-4.387	28.944	24.558	-21.442	46.000
675.261	-2.139	30.295	28.157	-17.843	46.000
866.449	0.526	30.483	31.009	-14.991	46.000
966.261	1.690	28.966	30.656	-23.344	54.000
Vertical					
Quasi-Peak					
159.333	-10.440	31.410	20.970	-22.530	43.500
387.072	-7.704	31.342	23.638	-22.362	46.000
559.986	-4.027	29.555	25.528	-20.472	46.000
731.493	-1.159	29.709	28.550	-17.450	46.000
866.449	0.526	30.916	31.442	-14.558	46.000
992.971	2.106	29.805	31.910	-22.090	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product	Radio Identification Device
Test Item	General Radiated Emission
Test Mode	Mode 1: Transmit (434.64 MHz)
Date of Test	2017/12/27

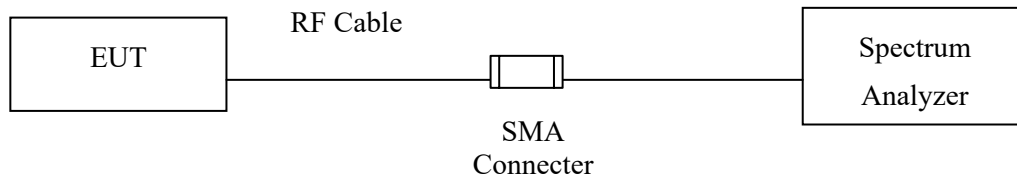
Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Quasi-Peak					
42.652	-10.960	29.322	18.362	-21.638	40.000
162.145	-10.521	29.394	18.872	-24.628	43.500
354.739	-8.623	29.853	21.230	-24.770	46.000
658.391	-2.464	29.105	26.641	-19.359	46.000
869.261	0.561	30.065	30.627	-15.373	46.000
1000.000	2.220	29.430	31.650	-22.350	54.000
Vertical					
Quasi-Peak					
79.203	-15.137	33.528	18.391	-21.609	40.000
232.435	-12.337	29.270	16.933	-29.067	46.000
446.116	-6.271	40.195	33.924	-12.076	46.000
600.754	-3.062	29.321	26.259	-19.741	46.000
759.609	-0.777	28.410	27.633	-18.367	46.000
869.261	0.561	30.525	31.087	-14.913	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

4. Transmit time

4.1. Test Setup



4.2. Limits

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

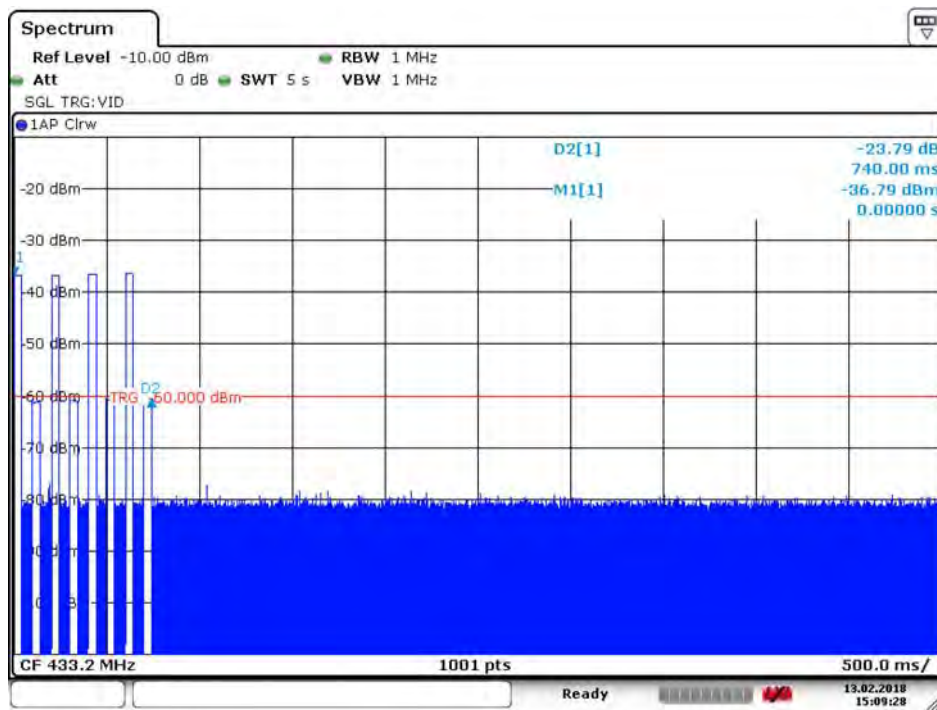
4.3. Uncertainty

$\pm 2.31\text{ms}$

4.4. Test Result

Product Radio Identification Device
 Test Item Transmit time
 Test Mode Mode 1: Transmit (433.2 MHz)

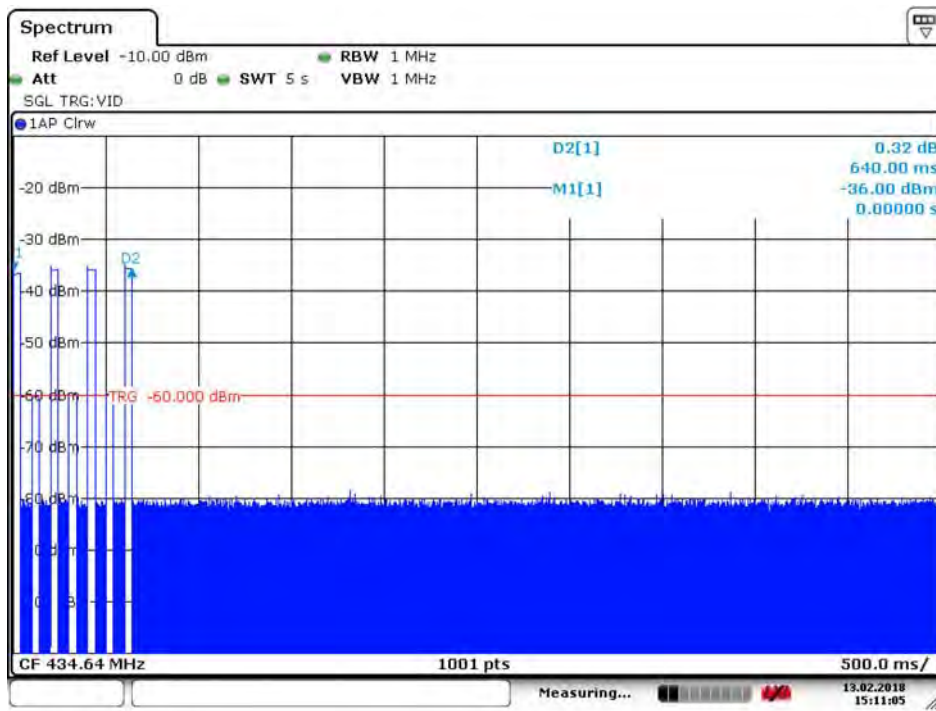
Channel No.	Frequency (MHz)	Measurement Value (Sec)	Limit (Sec)	Result
1	433.2	0.0740	< 5	Pass



Date: 13.FEB.2018 15:09:29

Product Radio Identification Device
 Test Item Transmit time
 Test Mode Mode 1: Transmit (434.64 MHz)

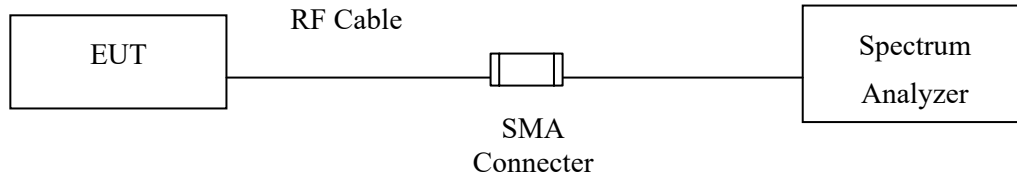
Channel No.	Frequency (MHz)	Measurement Value (Sec)	Limit (Sec)	Result
2	434.64	0.0640	< 5	Pass



Date: 13.FEB.2018 15:11:05

5. Occupied Bandwidth

5.1. Test Setup



5.2. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

5.3. Uncertainty

$\pm 279.2\text{Hz}$

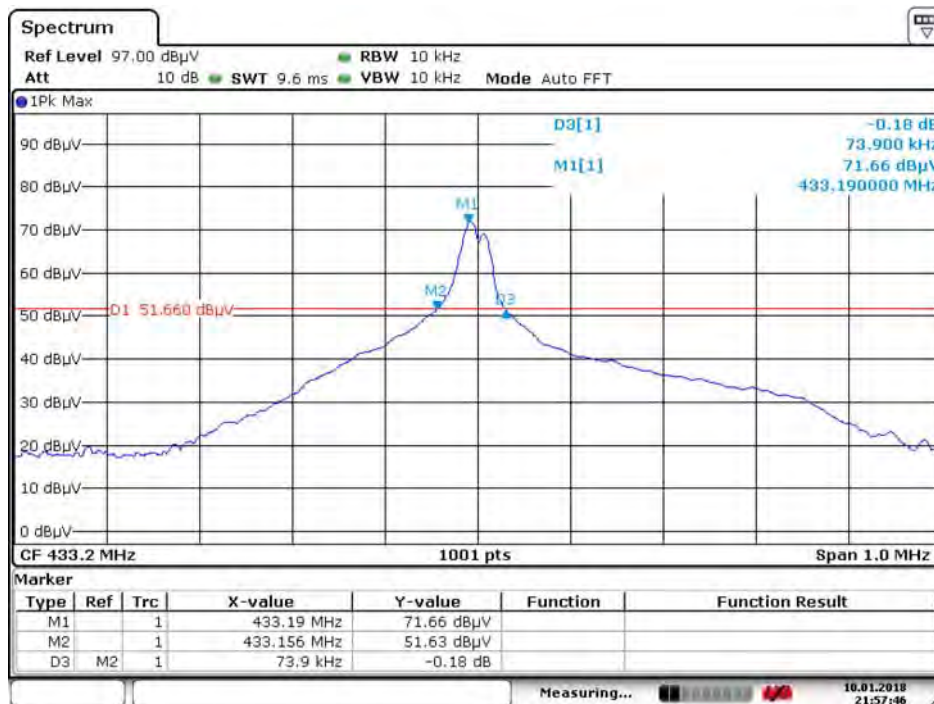
5.4. Test Result

Product Radio Identification Device
 Test Item Occupied Bandwidth
 Test Mode Mode 1: Transmit (433.2 MHz)

Channel No.	Frequency (MHz)	Measurement Value (MHz)	Limit (MHz)	Result
1	433.2	0.0739	1.0866	Pass

Note: Limit = 433.2MHz * 0.25%= 1.0866MHz

Figure Channel 1:



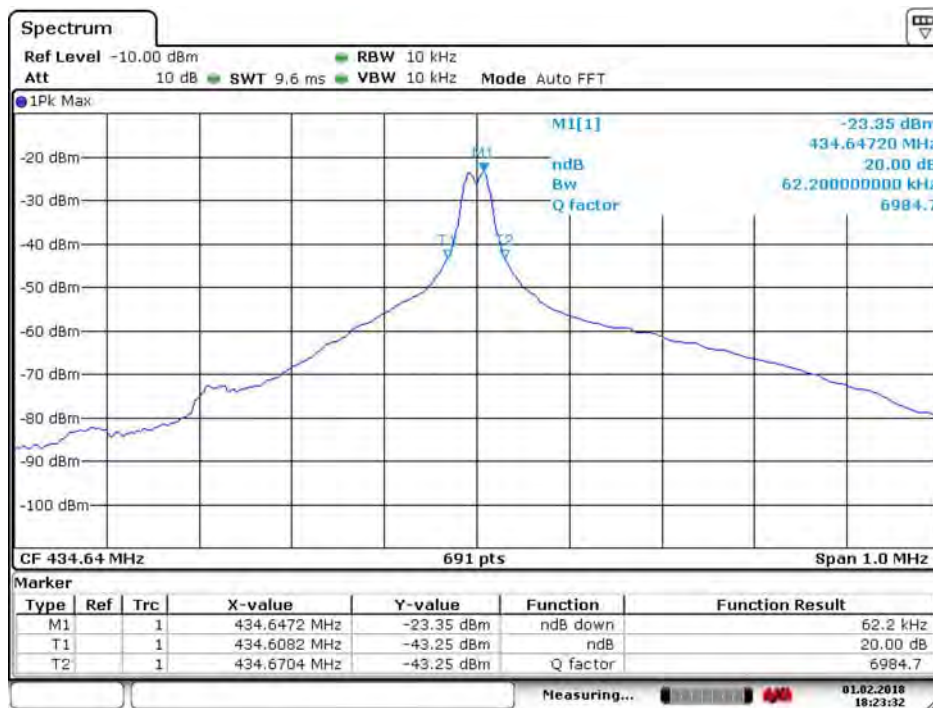
Date: 10 JAN 2018 21:57:46

Product Radio Identification Device
 Test Item Occupied Bandwidth
 Test Mode Mode 1: Transmit (434.64 MHz)

Channel No.	Frequency (MHz)	Measurement Value (MHz)	Limit (MHz)	Result
2	434.64	0.0622	1.0866	Pass

Note: Limit = 434.64MHz * 0.25%= 1.0866MHz

Figure Channel 2:



Date: 1.FEB.2018 18:23:32