TECHNICAL REPORT

Report No:	EMC2003020-02
File Reference No.:	2020-03-17
Applicant:	
Product:	Bluetooth Speaker
Brand Name:	N/A
Model No:	P329.333, P329.335, P329.336, P329.337
Test Standards:	ETSI EN 300 328 v2.1.1 (2016-11)
Test Result:	The RF Spectrum testing has been performed on the submitted samples and found in compliance with council RE Directive 2014/53/EU

Approved By:

Terry Tang

EMC Manager

Dated: March 17, 2020

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

Test Report Conclusion

Content

1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The TIMEWAY Lab does not assume Responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the TIMEWAY Lab.

1.2 Testing Laboratory

SHENZHEN TIMEWAY TESTING LABORATORIES
Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China
Tel: +86 755 83448688 Fax: +86 755 83442996
Internet: www.timeway-lab.com

Site on File With the Federal Communications and Commission – United States
Registration Number: 744189
For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A
For 3m Anechoic Chamber

1.3 Test Data

Date of Receipt of Application: March 05, 2020
Date of Receipt of Test Item: March 05, 2020
Date of Test: March 05, 2020 ~ March 17, 2020

1.4 Description of EUT

EUT Type……:	Bluetooth Speaker	
Applicant……:		
Manufacturer……..:		
Equipment type……....:	Bluetooth 2.4G	
Modulation Type (Technology)…….:	GFSK, JI/4DQPSK, 8DPSK for Bluetooth	
Operating Frequency Range……..:	2.402GHz - 2.480GHz	
Modulation used by the equipment.	FHSS	
Maximum e.r.i.p…….....:	3.93 dBm	
Maximum OCB …….....:	GFSK	824kHz
	JI/4DQPSK	1170kHz
Adaptive Mode……..:	Adaptive/non-adaptive equipment:	Adaptive Equipment without the possibility to switch to a non-adaptive mode
	LBT Base DAA:	Yes
	Non-LBT Base DAA:	No
	Number of transmit chain:	1
	Number of receive chain:	1
	Channel Occupancy Time:	17.916 ms (worse case)
Antenna Gain……:	Antenna Type:	PCB Antenna
	Antenna Gain:	0.58dBi
Operating voltage…….……..……..:	Normal：	DC3.7V
	Lowest：	DC3.3V
	Highest：	DC4.2V
Operating temperature……...:	Normal：	25℃
	Lowest：	-20℃
	Highest：	40℃

1.5 Setting of test system

Setting	Value	
EUT type:	Bluetooth 2.4G	
	Mode	Data Rate
	GFSK	1Mbps
	JI/4DQPSK,	2Mbps
	8DPSK	3Mbps
EUT frequency configurable:	Yes	
Test channel-Low:	2402MHz (GFSK, JI/4DQPSK, 8DPSK)	
Test channel-Middle:	2441MHz (GFSK, JI/4DQPSK, 8DPSK)	
Test channel-High:	2480MHz (GFSK, JI/4DQPSK, 8DPSK)	
Adaptive:	Yes	
With TPC function:	No	
Number of the antenna:	1	
Number of transmission chains:	1	
Beam forming:	No	
Operating frequency range:	2400MHz~2483.5MHz	
Maximum beam forming gain:	N.A	
Antenna gain:	0.58dBi	

1.6 Test Standards

ETSI EN 300 328 v 2.1.1 (2016-11)

Wideband transmission systems;

Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques;

Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

1.7 Configuration of The EUT

The EUT was configured according to **CISPR16.** All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model
Bluetooth Speaker	**Richen Industrial Co., Ltd.**	**P329.333, P329.335, P329.336, P329.337**

B. Internal Devices

Device	Manufacturer	Model
N/A		

C. Peripherals

Device	Manufacturer	Model	Cable
N/A			

D. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

1.8 EUT Modifications

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

1.9 Tests or Witness Test Engineering

Test By: _____

Printing Name: Terry Tang

2. Technical Test

2.1 Summary of Test Results

No deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (Only "Passed" if all Measurements are "Passed")	**Pass**

2.2 Test Report

Test Report Reference

List of Measurements		
Parameter to be measured	**Clause**	**Result**
Transmitter Parameters		
RF output power	Clause 4.3.1.2	Pass
Duty Cycle, Tx-sequence, Tx-gap	Clause 4.3.1.3	N/A
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	Clause 4.3.1.4	Pass
Hopping Frequency Separation	Clause 4.3.1.5	Pass
Medium Utilisation (MU) Factpr	Clause 4.3.1.6	N/A
Adaptivity (Adaptive Frequency Hopping)	Clause 4.3.1.7	N/A
Occupied Channel Bandwidth	Clause 4.3.1.8	Pass
Transmitter unwanted emissions in the out-of-band domain	Clause 4.3.1.9	Pass
Transmitter unwanted emissions in the spurious domain	Clause 4.3.1.10	Pass
Receiver Parameters		
Receiver Spurious Emissions	Clause 4.3.1.11	Pass
Receiver Blocking	Clause 4.3.1.12	Pass
Geo-location capability	Clause 4.3.1.13	N/A*

Note: The clause numbers are referenced to ETSI EN 300 328 v2.1.1 (2016-11)

Note: 1.N/A= Not applicable. Because these requirements do not apply for equipment with a maximum declared RF Output power of less than 10 dBm e.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p. For the EUT, the RF output power less than 10dBm.

2. N/A*: EUT without Geo-location capability

Clause 4.3.1.2 RF output Power (Conducted)

Test Method according to clause 5.4.2.2.1

GFSK Mode

Test Conditions	Transmitter Power （dBm) EIRP				
	T_{nom} (25℃)	T_{min} (-20℃)		T_{max} (40℃)	
	DC3.7V	DC4.2V	DC3.3V	DC4.2V	DC3.3V
Low Freq.2402MHz	3.88	3.91	3.76	3.93	3.78
Mid Freq.2441MHz	3.59	3.65	3.54	3.68	3.49
High Freq.2480MHz	3.22	3.35	3.20	3.27	3.17

JI/4DQPSK Mode

Test Conditions	Transmitter Power （dBm) EIRP				
	T_{nom} (25℃)	T_{min} (-20℃)		T_{max} (40℃)	
	DC3.7V	DC4.2V	DC3.3V	DC4.2V	DC3.3V
Low Freq.2402MHz	3.62	3.65	3.59	3.67	3.53
Mid Freq.2441MHz	3.37	3.39	3.27	3.46	3.22
High Freq.2480MHz	3.04	3.16	3.01	3.12	2.98

8DPSK Mode

Test Conditions	Transmitter Power （dBm) EIRP				
	T_{nom} (25℃)	T_{min} (-20℃)		T_{max} (55℃)	
	DC3.7V	DC4.2V	DC3.3V	DC4.2V	DC3.3V
Low Freq.2402MHz	3.51	3.57	3.48	3.55	3.41
Mid Freq.2441MHz	3.39	3.52	3.36	3.42	3.25
High Freq.2480MHz	3.15	3.29	3.14	3.24	3.09

Limits: Clause 4.3.1.2.3

The maximum RF output power for adaptive Frequency Hopping equipment shall be equal to or less than 20 dBm.

Clause 4.3.1.4 Accumulated Transmit Time, Minimum Frequency Occupation and Hopping Sequence

For Adaptive frequency hopping system

Test method according to Clause 5.4.4.2.1

2402 MHz

GFSK Mode

Accumulated Transmit Time								
Mode	Number of Hopping Channel	Number of transmission in a period (Channel Number * 0.4sec)				Length of transmissions Time (ms)	Result (ms)	Limit (ms)
		Period (Sec)	Sweep Time (Sec)	Times in a sweep	Times in a period			
DH1	79	31.6	6	56	294.93	0.481	141.86	400
DH3	79	31.6	6	18	94.8	1.703	161.44	400
DH5	79	31.6	6	14	73.73	2.986	220.16	400

JI/4DQPSK Mode

Accumulated Transmit Time								
Mode	Number of Hopping Channel	Number of transmission in a period (Channel Number * 0.4sec)				Length of transmissions Time (ms)	Result (ms)	Limit (ms)
		Period (Sec)	Sweep Time (Sec)	Times in a sweep	Times in a period			
DH1	79	31.6	6	57	300.2	0.501	150.40	400
DH3	79	31.6	6	18	94.8	1.764	167.23	400
DH5	79	31.6	6	10	52.67	3.006	158.33	400

GFSK Mode

Minimum Frequency Occupation Time					
Mode	Number of Hopping Channel	Number of transmission in a period of 4* Dwell * number of hopping channel	Length of transmissions Time (ms)	Result (ms)	Minimum Limit (ms)
DH1	79	2	0.481	0.962	0.481
DH3	79	2	1.703	3.406	1.703
DH5	79	6	2.986	17.916	2.986

JI/4DQPSK Mode

Minimum Frequency Occupation Time					
Mode	Number of Hopping Channel	Number of transmission in a period of 4* Dwell * number of hopping channel	Length of transmissions Time (ms)	Result (ms)	Minimum Limit (ms)
DH1	79	2	0.501	1.002	0.501
DH3	79	2	1.764	3.528	1.764
DH5	79	2	3.006	6.012	3.006

2480 MHz

GFSK Mode

Accumulated Transmit Time								
Mode	Number of Hopping Channel	Number of transmission in a period (Channel Number * 0.4sec)				Length of transmissions Time (ms)	Result (ms)	Limit (ms)
		Period (Sec)	Sweep Time (Sec)	Times in a sweep	Times in a period			
DH1	79	31.6	6	59	310.73	0.441	137.03	400
DH3	79	31.6	6	17	89.53	1.743	156.05	400
DH5	79	31.6	6	12	63.2	2.986	188.72	400

JI/4DQPSK Mode

Accumulated Transmit Time								
Mode	Number of Hopping Channel	Number of transmission in a period (Channel Number * 0.4sec)				Length of transmissions Time (ms)	Result (ms)	Limit (ms)
		Period (Sec)	Sweep Time (Sec)	Times in a sweep	Times in a period			
DH1	79	31.6	6	56	294.93	0.441	130.06	400
DH3	79	31.6	6	17	89.53	1.764	157.93	400
DH5	79	31.6	6	13	68.47	3.006	205.82	400

GFSK Mode

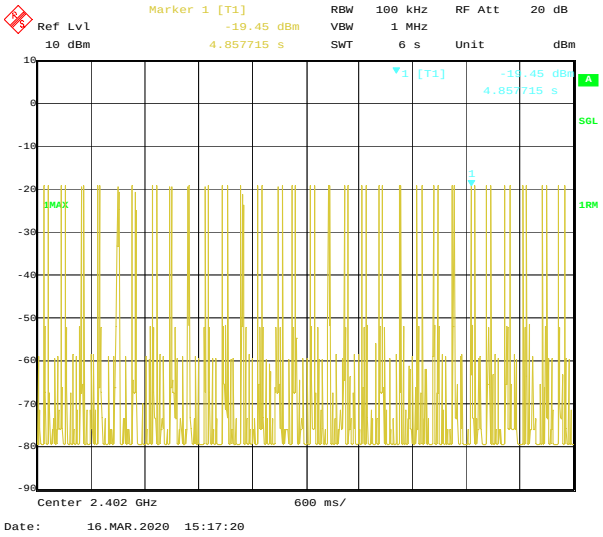
Minimum Frequency Occupation Time					
Mode	Number of Hopping Channel	Number of transmission in a period of 4* Dwell * number of hopping channel	Length of transmissions Time (ms)	Result (ms)	Minimum Limit (ms)
DH1	79	2	0.441	0.882	0.441
DH3	79	2	1.743	3.486	1.743
DH5	79	2	2.986	5.972	2.986

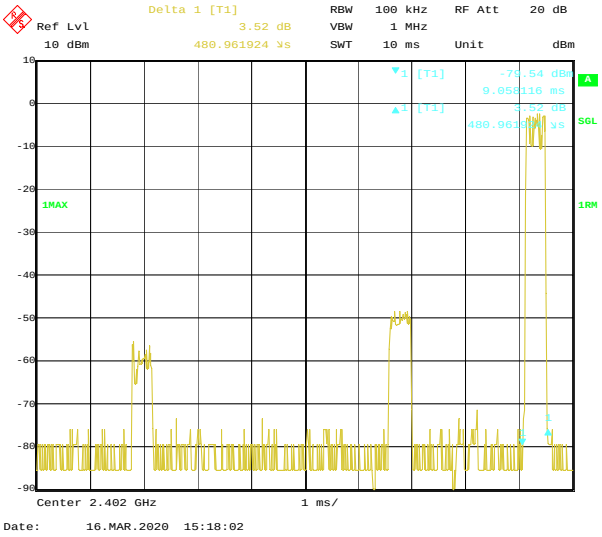
JI/4DQPSK Mode

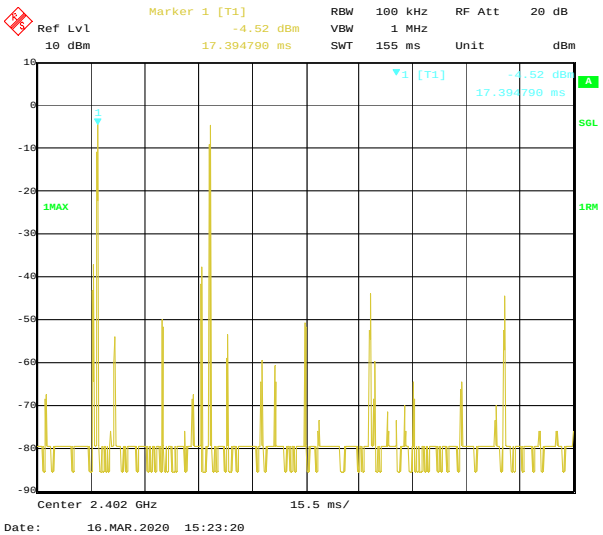
Minimum Frequency Occupation Time					
Mode	Number of Hopping Channel	Number of transmission in a period of 4* Dwell * number of hopping channel	Length of transmissions Time (ms)	Result (ms)	Minimum Limit (ms)
DH1	79	2	0.441	0.882	0.441
DH3	79	3	1.764	3.528	1.764
DH5	79	2	3.006	6.012	3.006

2402 MHz
GFSK Mode

DH1







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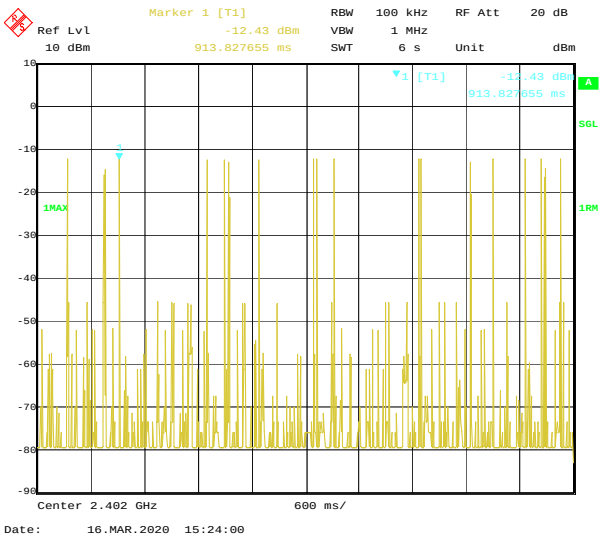

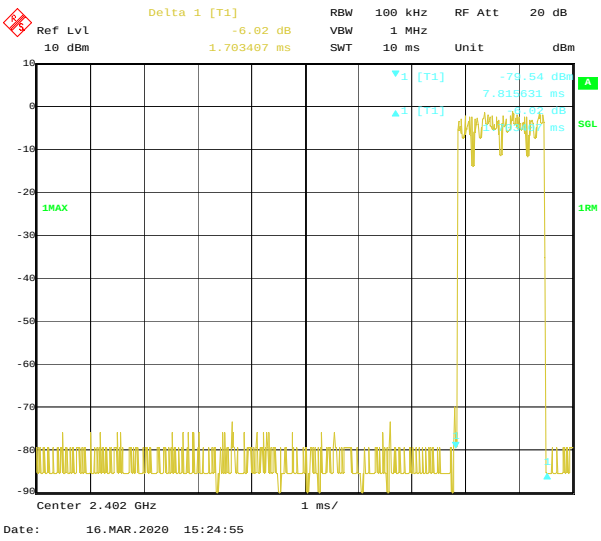

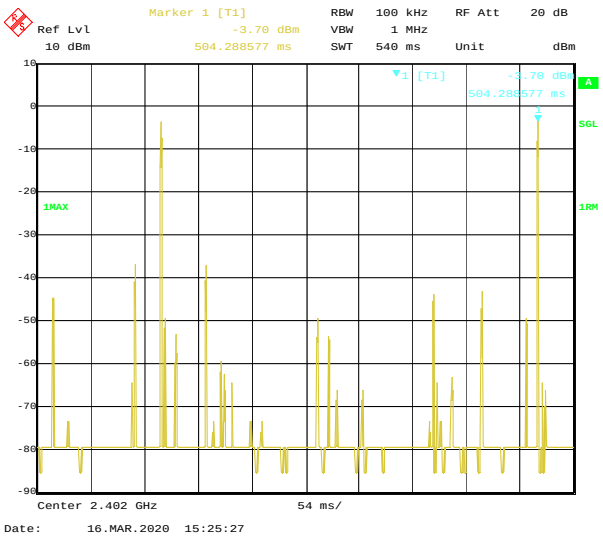

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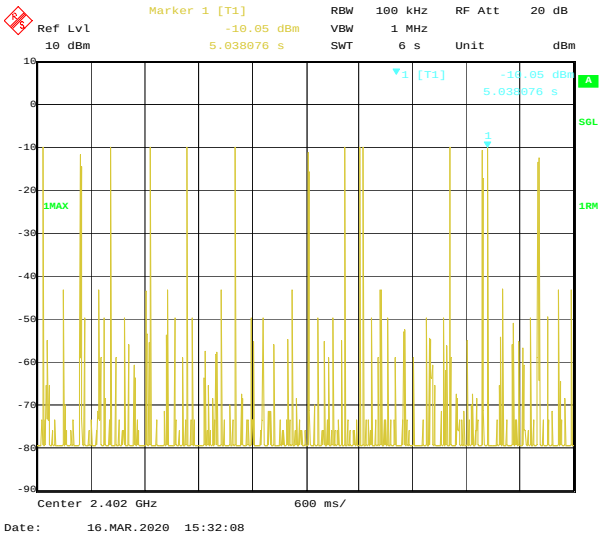
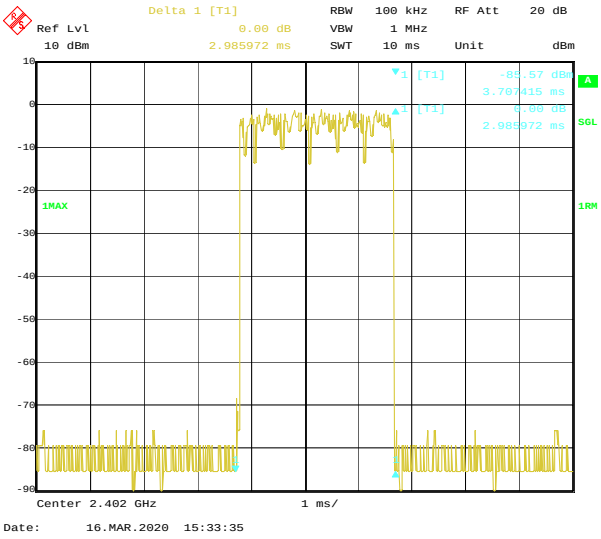
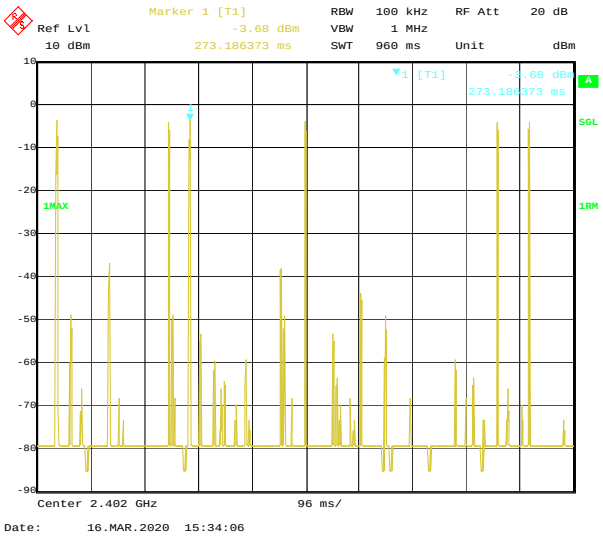
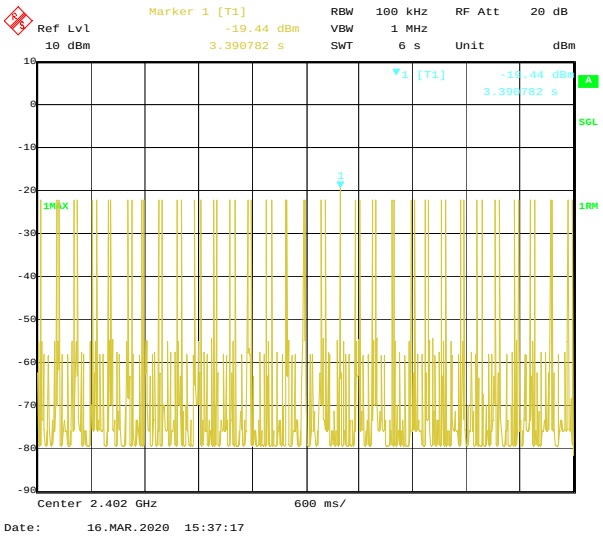


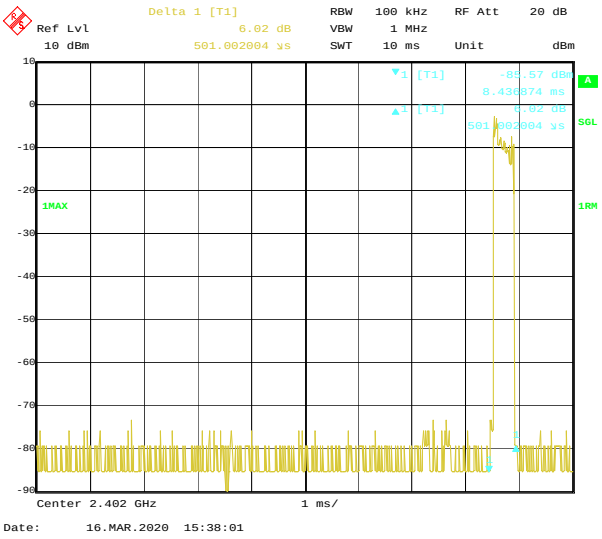


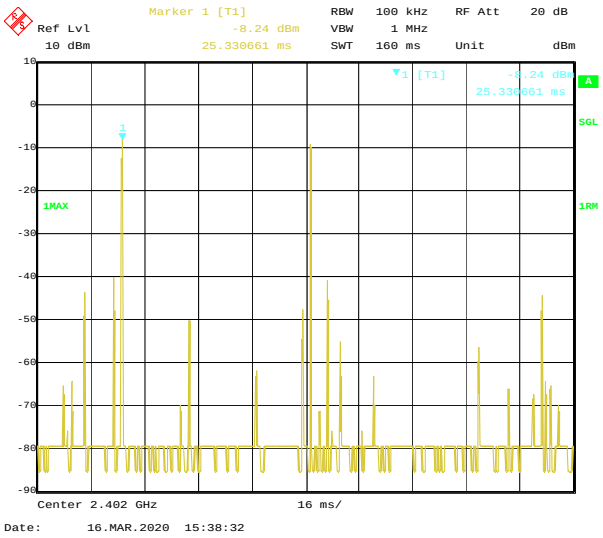


JI/4DQPSK Mode

DH1







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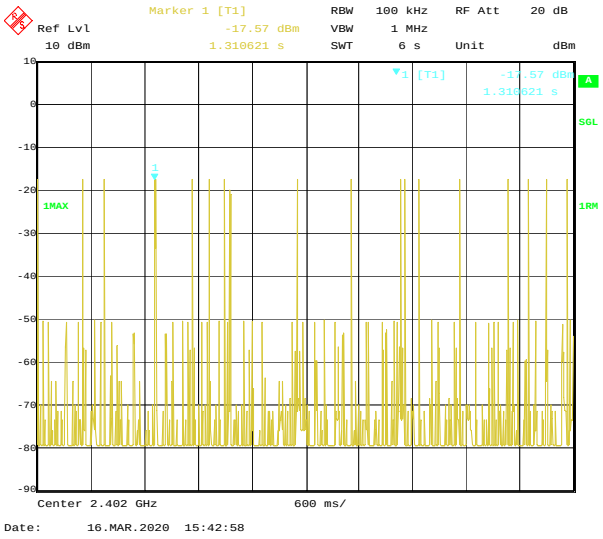

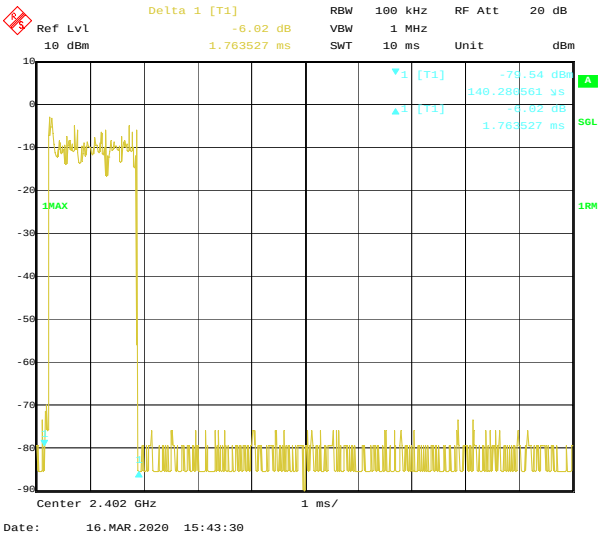

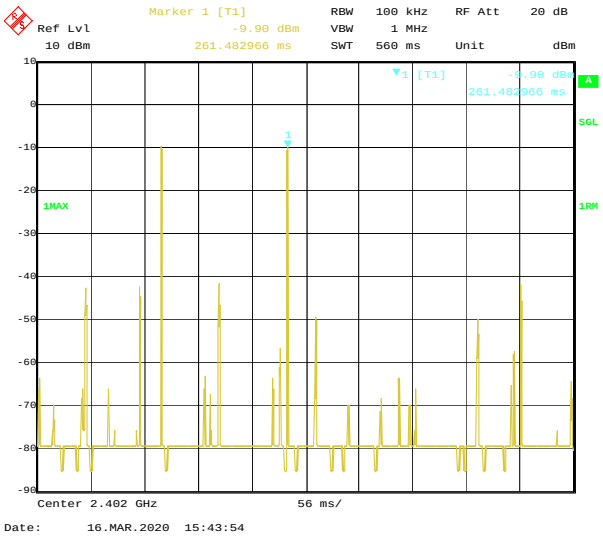

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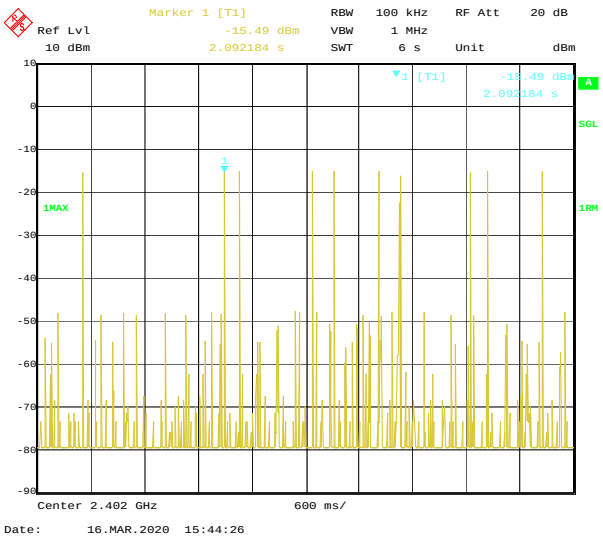
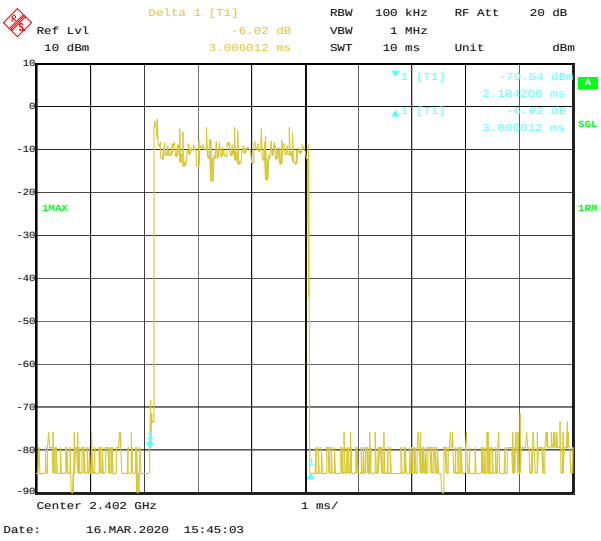
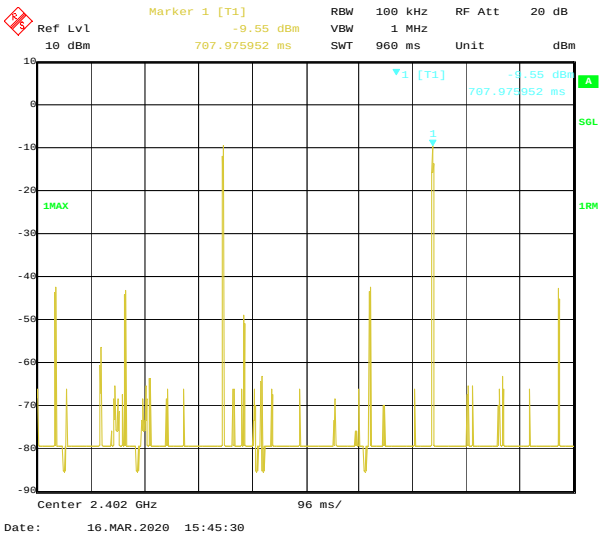


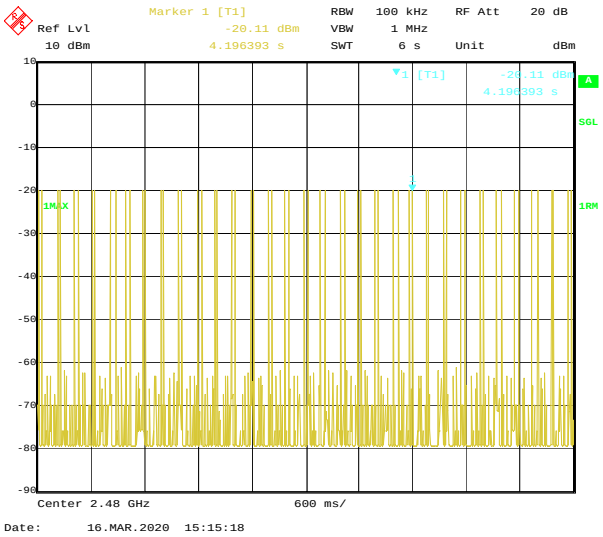


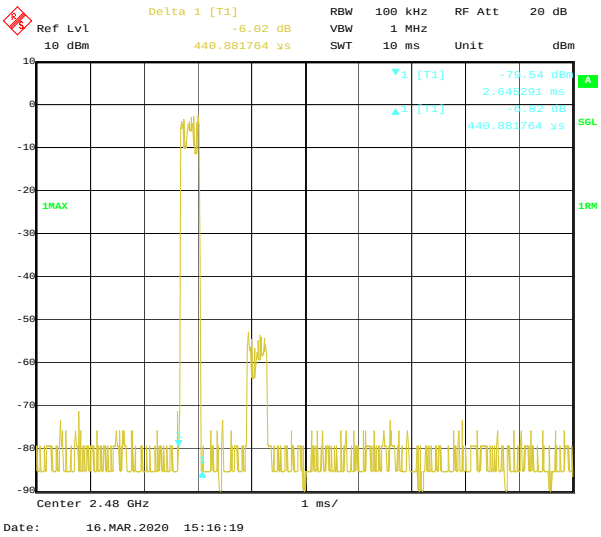


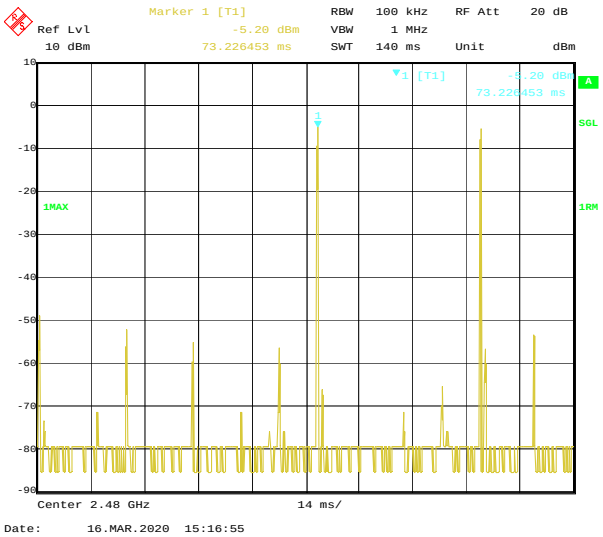
2480 MHz

GFSK Mode

DH1







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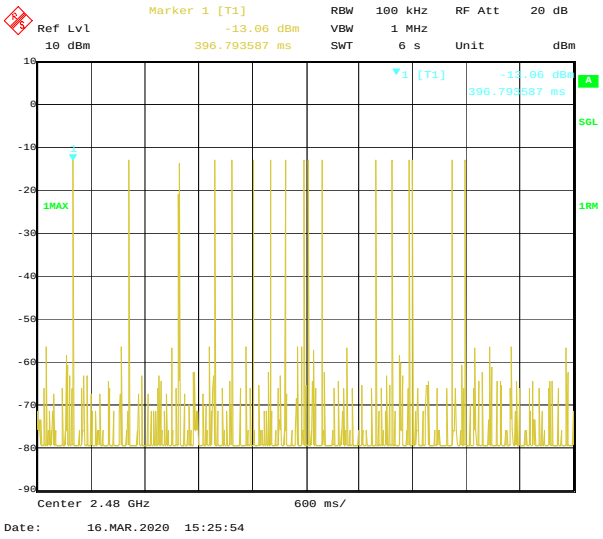

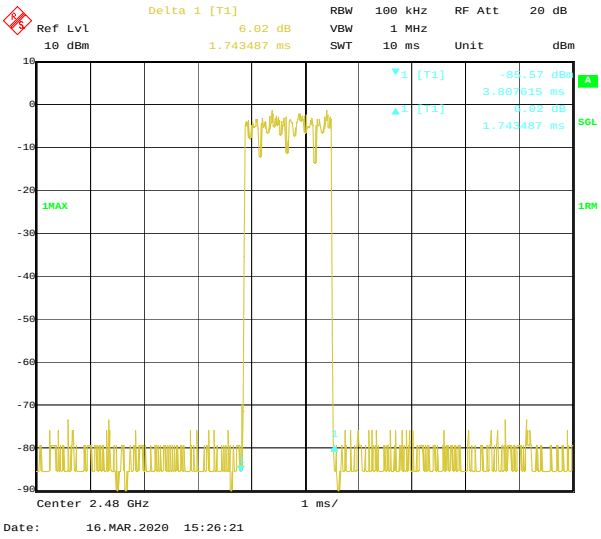

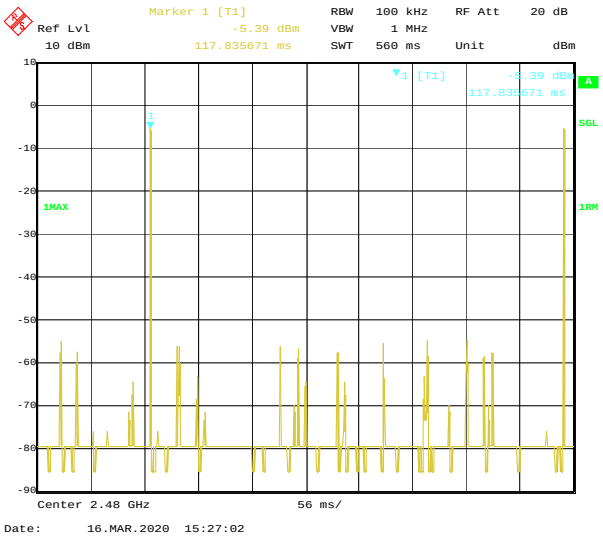

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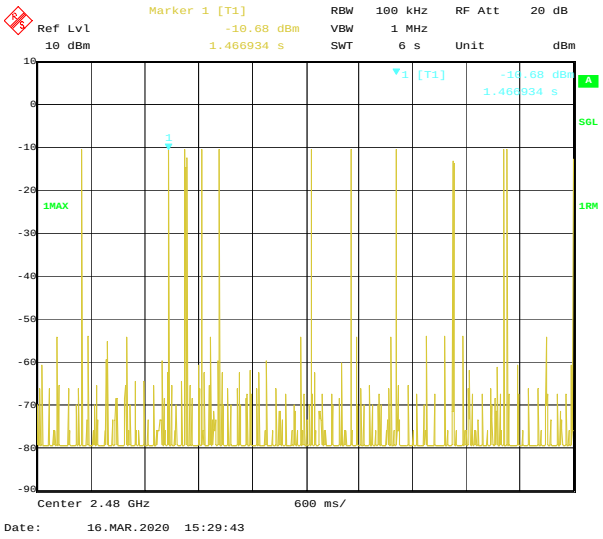
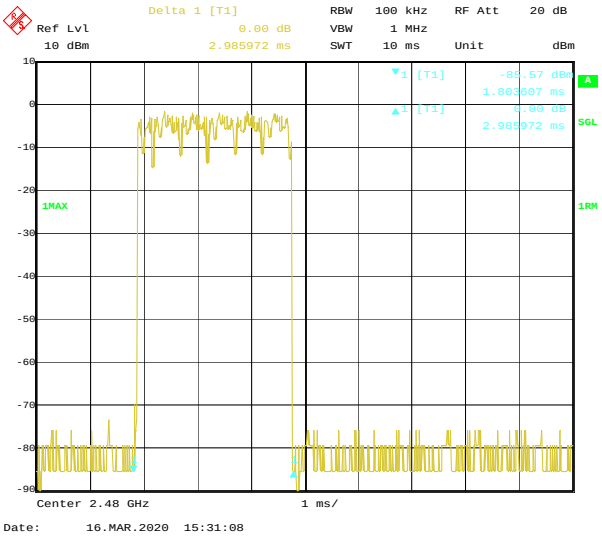
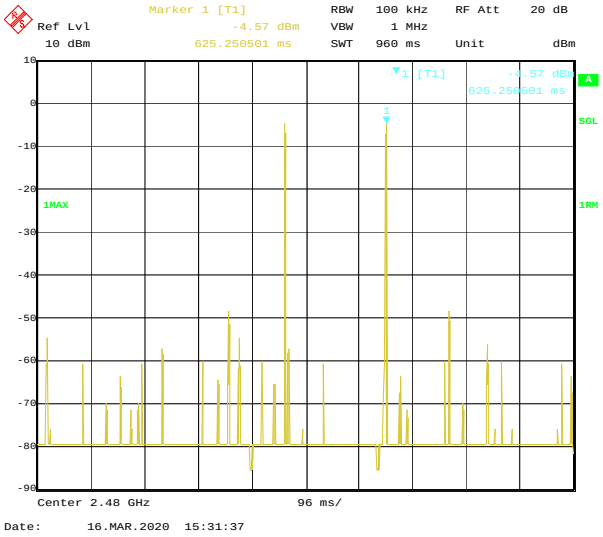
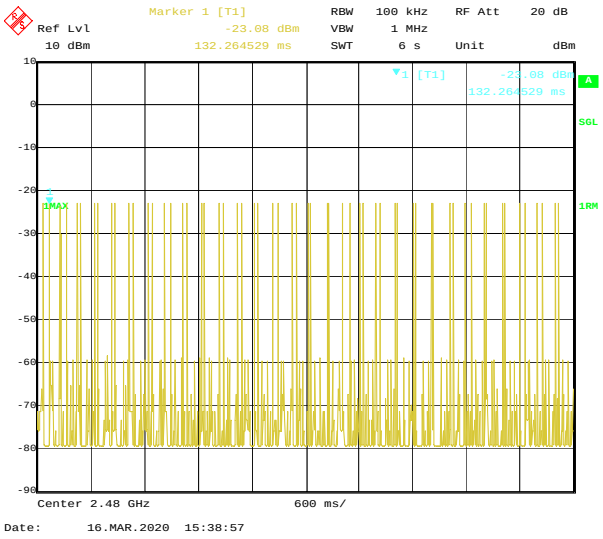


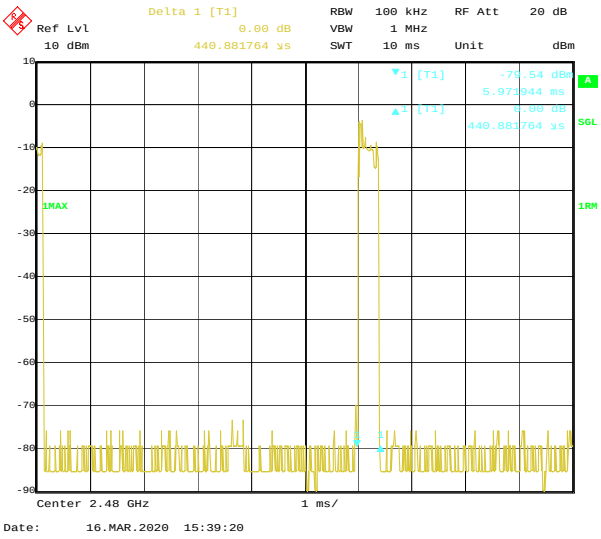


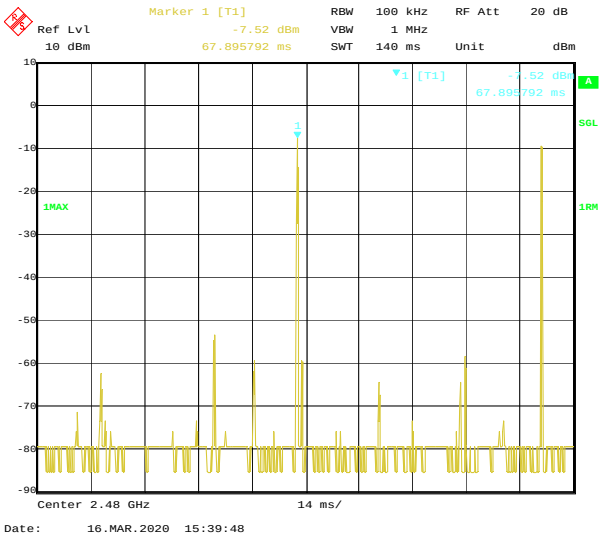


JI/4DQPSK Mode

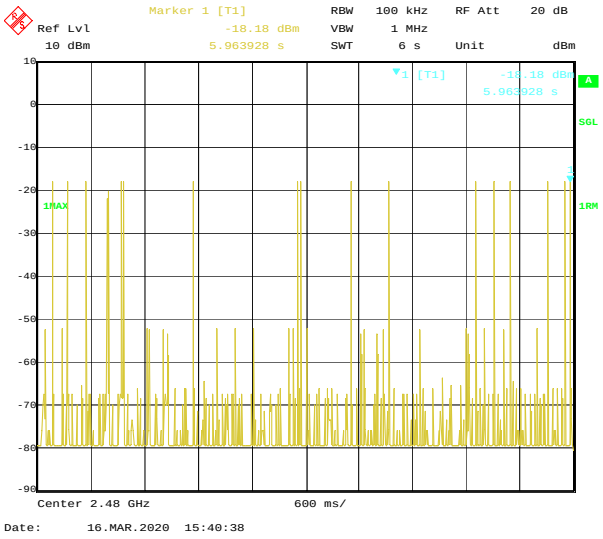
DH1

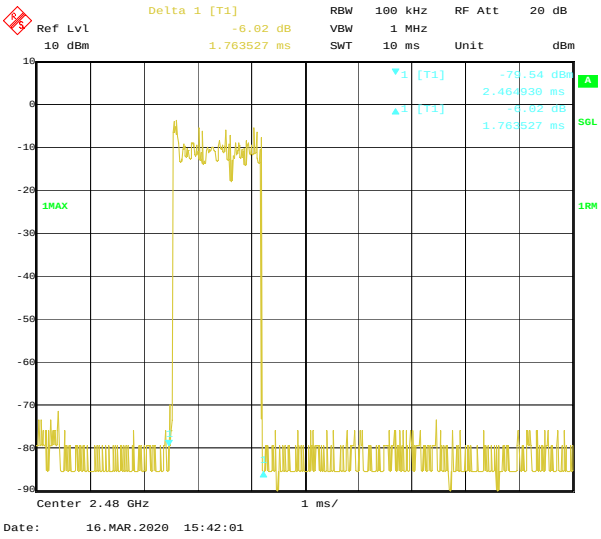


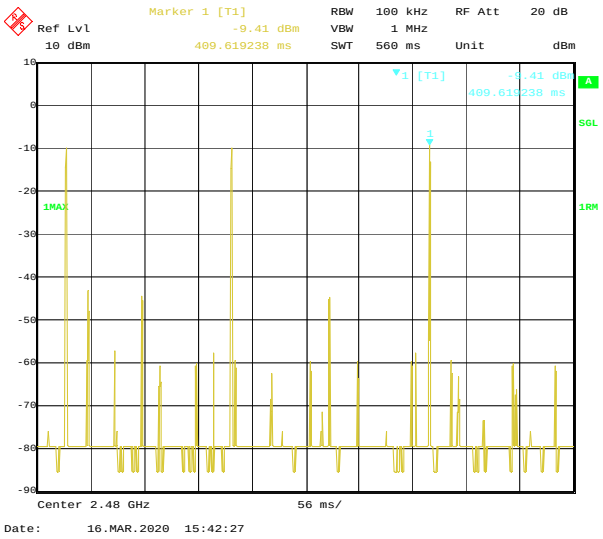




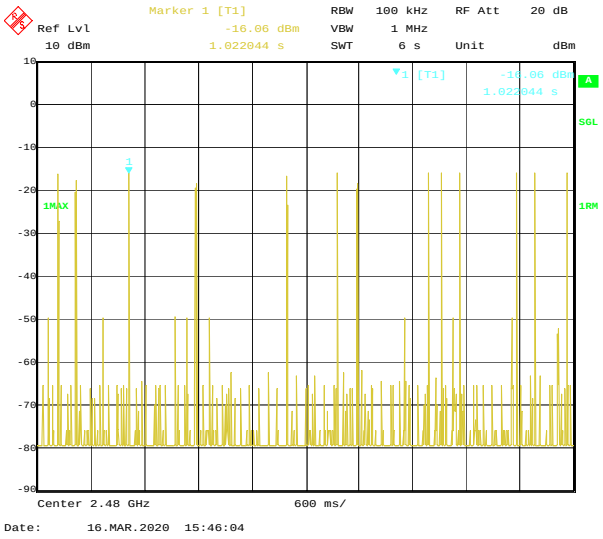
DH3

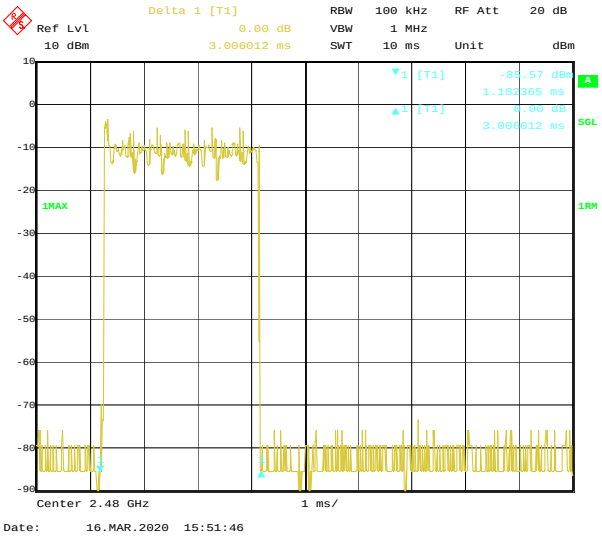


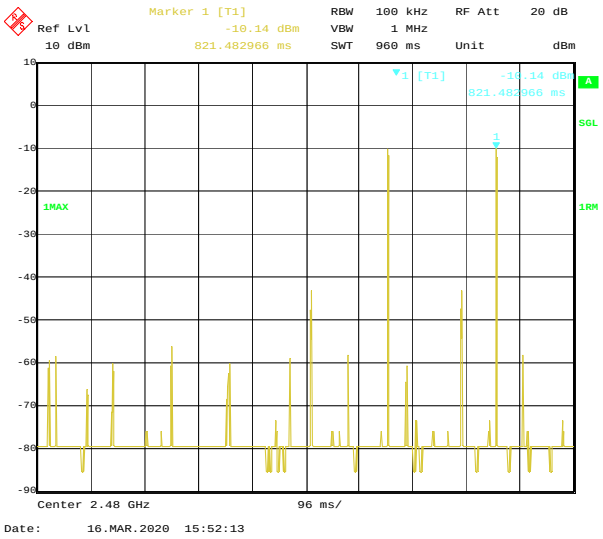




DH5





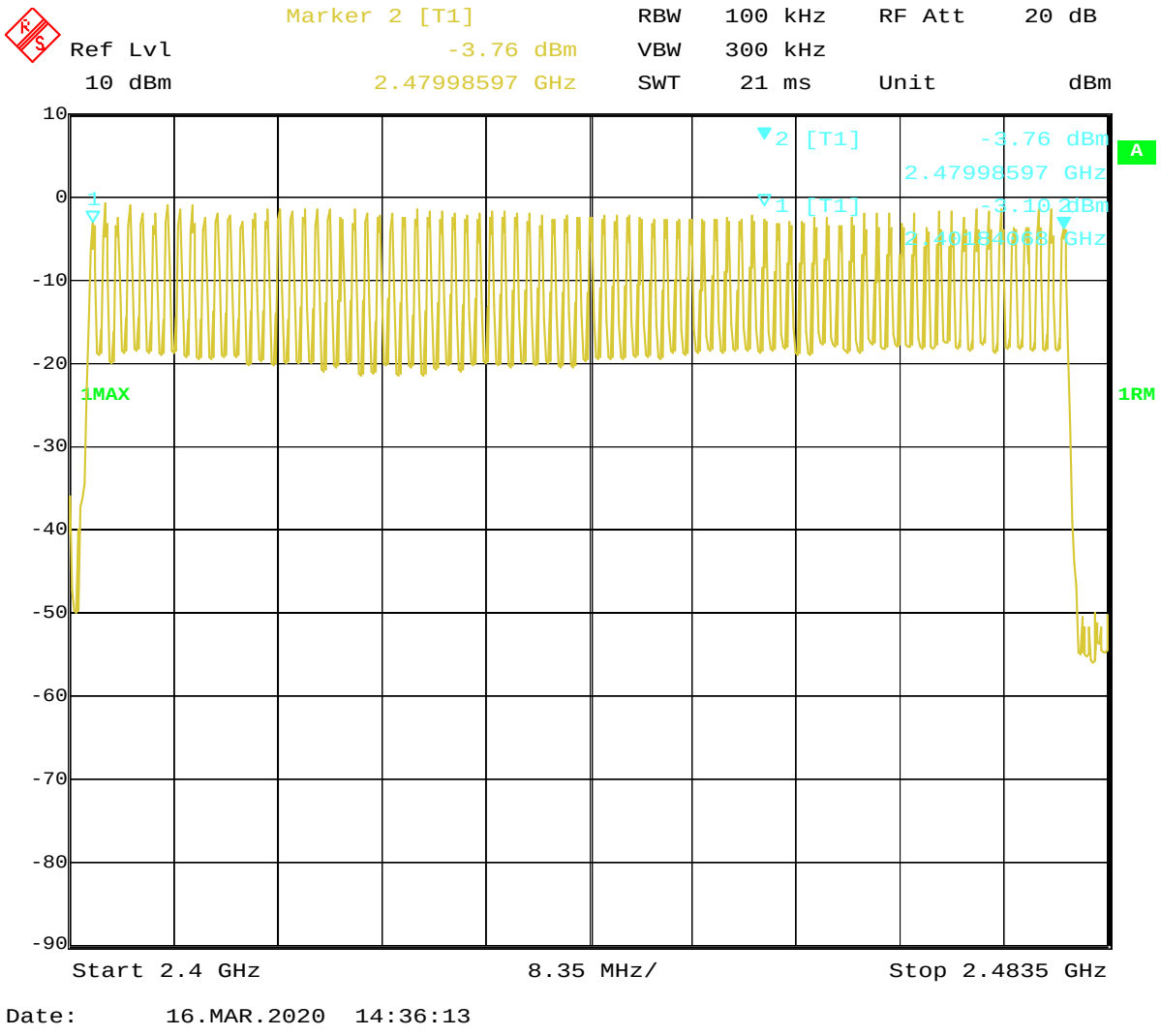


Hopping sequence

GFSK

EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

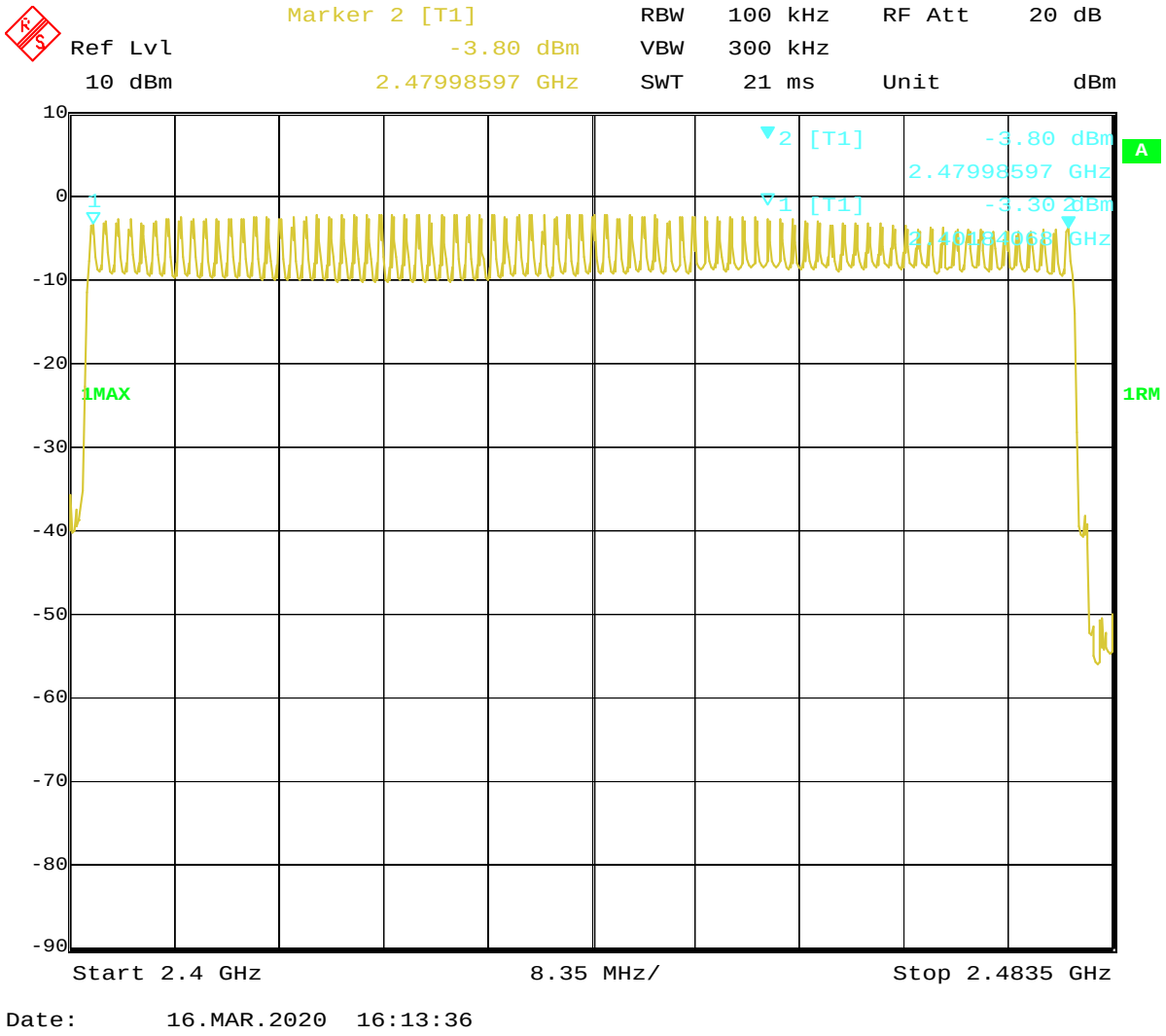
Operating Frequency	Number of hopping channels	Limit	Pass/ Fail
2402-2480MHz	79	≥ 15	Pass



JI/4DQPSK Mode

EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

Operating Frequency	Number of hopping channels	Limit	Pass/ Fail
2402-2480MHz	79	≥ 15	Pass



Note: Note: GFSK andJI/4DQPSK Mode was the worse case

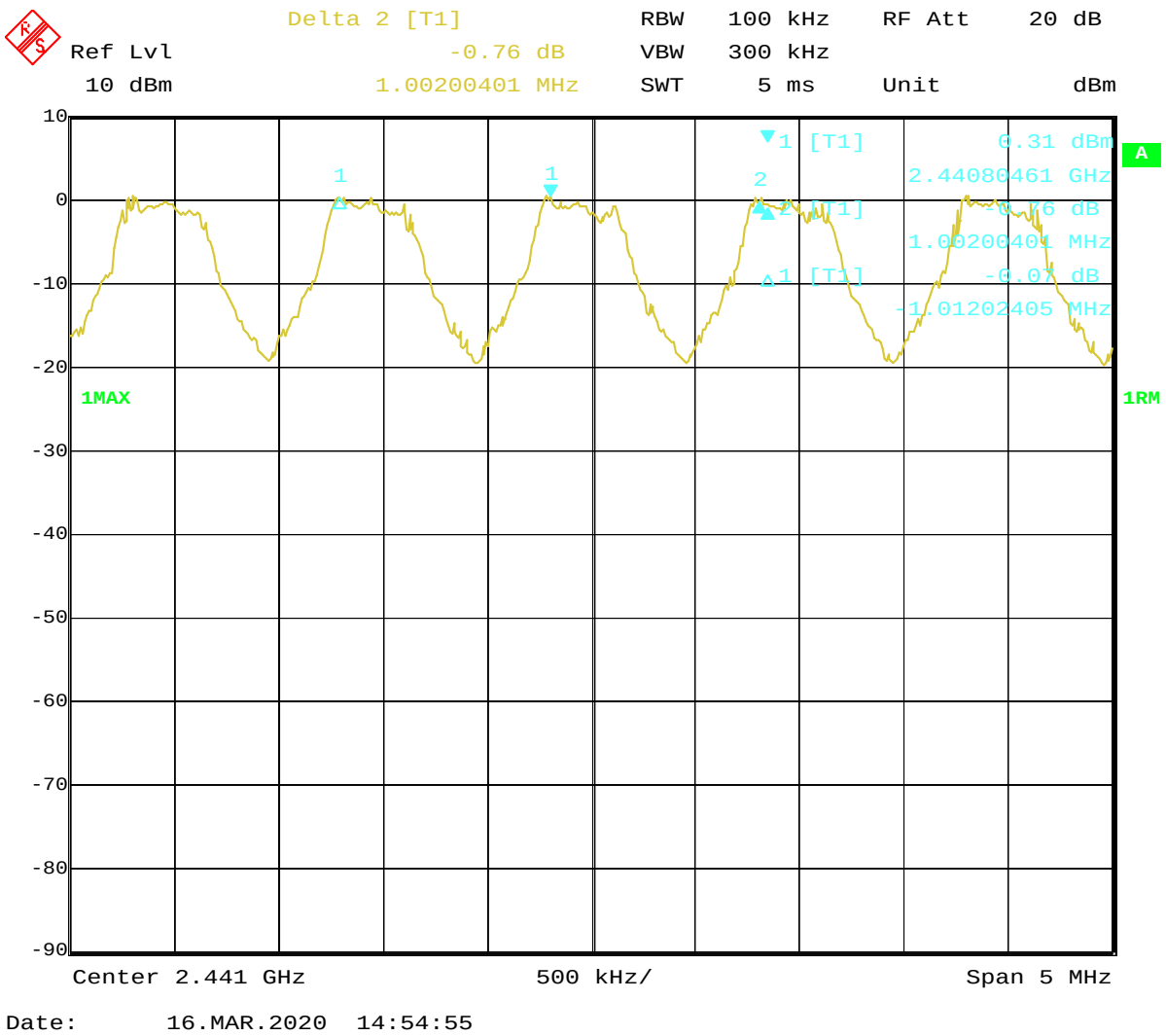
Clause 4.3.1.5 Hopping Frequency Separation

Test method according to Clause 5.4.5.2.1.3

GFSK Mode

EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

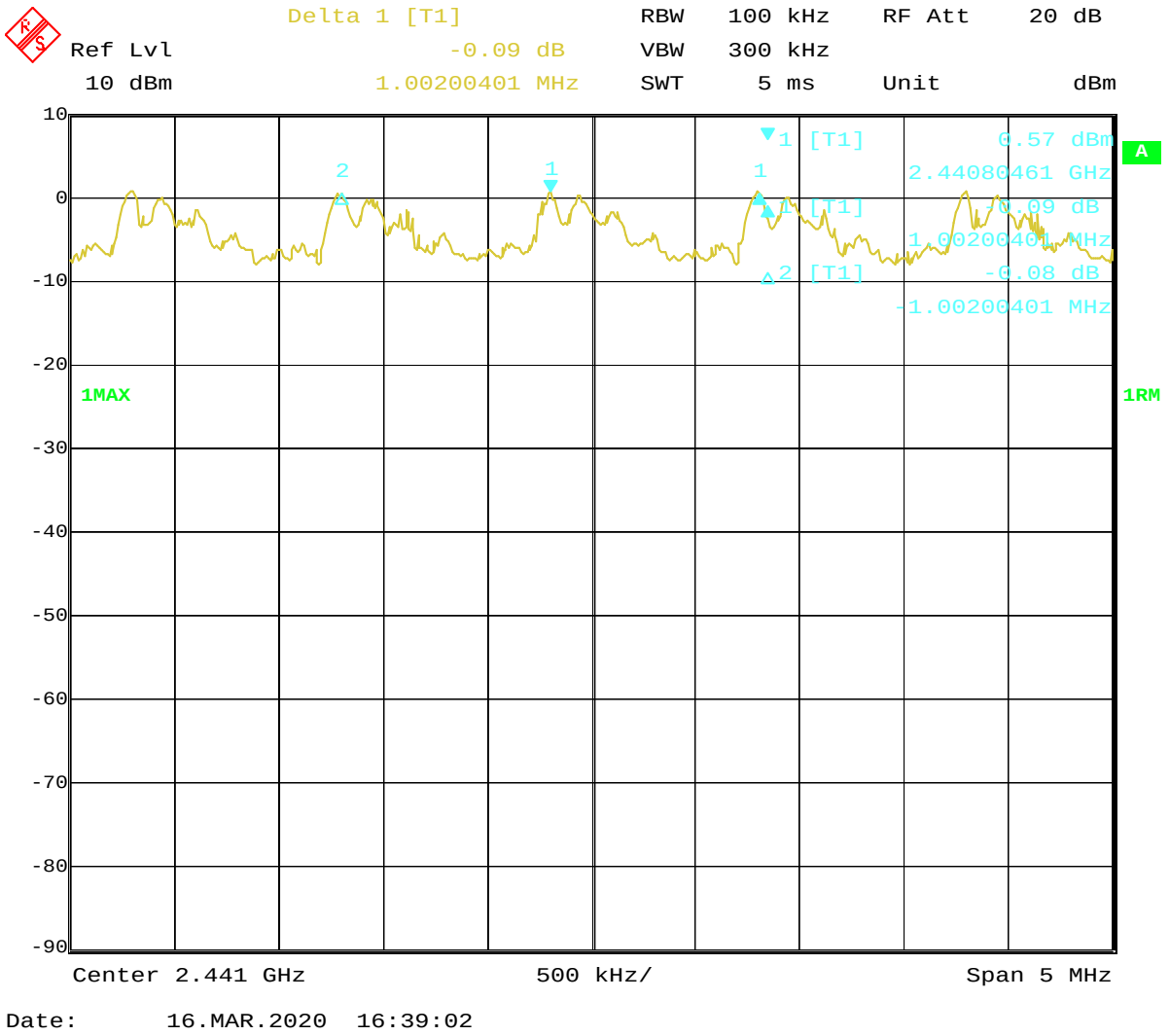
Channel	Channel Frequency (MHz)	Carrier Frequency Separation	Limit	Pass/ Fail
Middle	2441	1.000MHz	≥100kHz	Pass



JI/4DQPSK Mode

EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Carrier Frequency Separation	Limit	Pass/ Fail
Middle	2441	1.000MHz	≥100kHz	Pass



Note: Note: GFSK andJI/4DQPSK Mode was the worse case

Clause 4.3.1.8 Occupied Channel Bandwidth

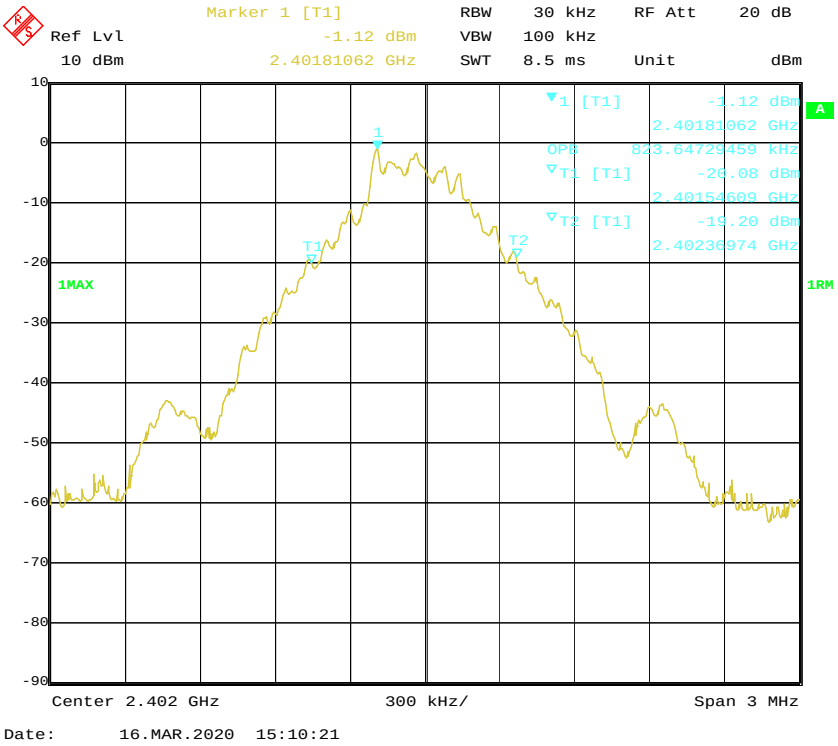
Test method according to Clause 5.4.7.2.1

GFSK Mode

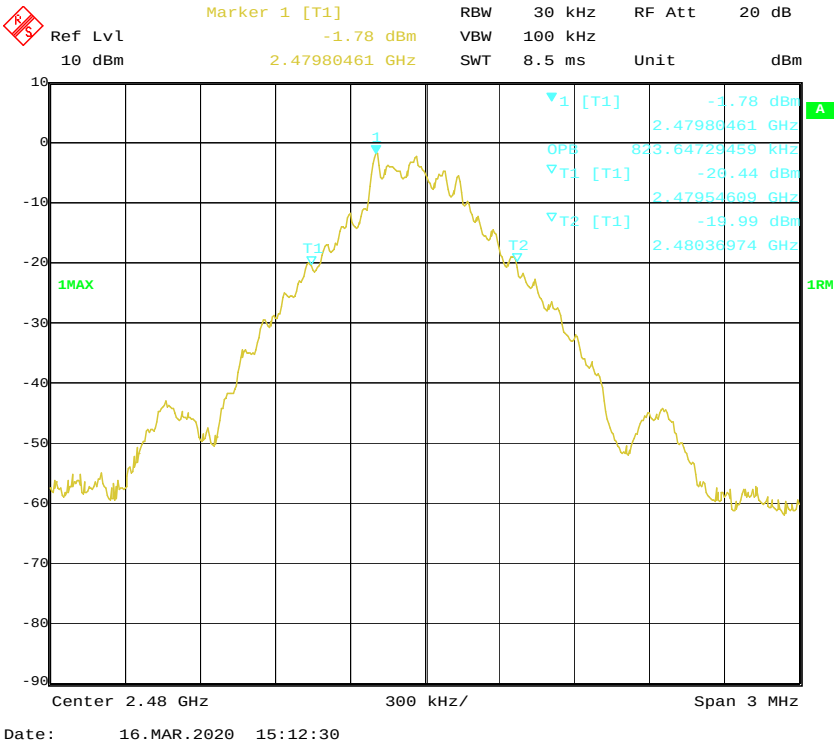
EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	99% Channel Bandwidth (kHz)	Measured Frequency (MHz)	Limit(MHz)
Low	2402	824	2401.55	≥2400
High	2480	824	2480.37	≤2483.5
Result: Pass				

Low Channel



High Channel

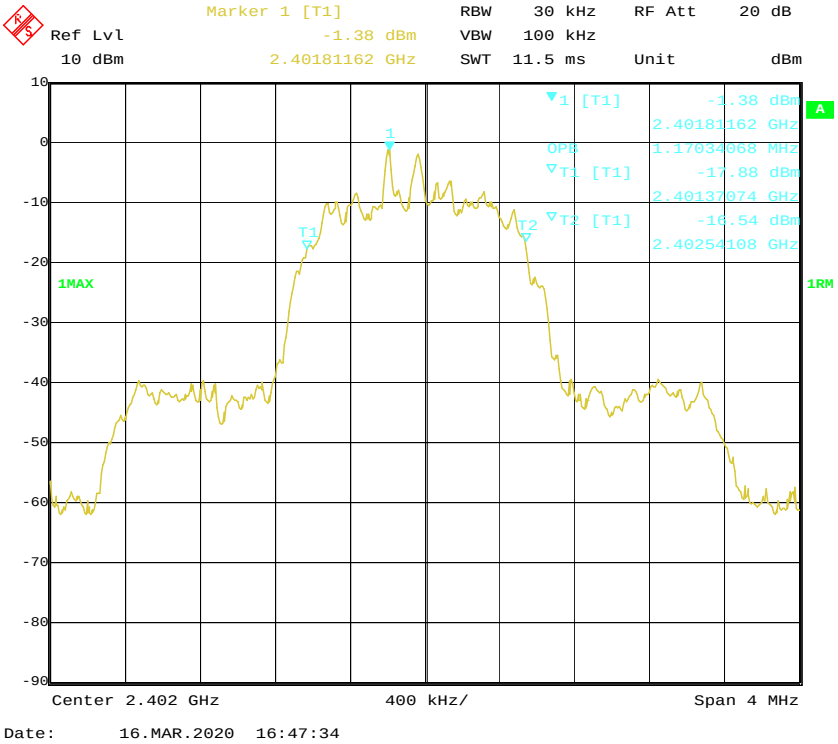


Л/4DQPSK Mode

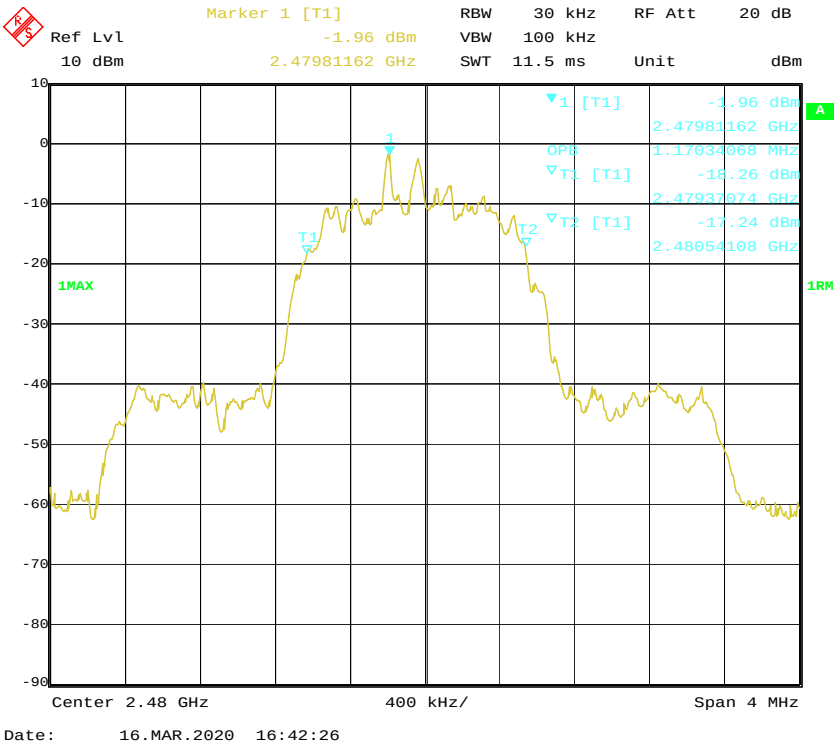
EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	99% Channel Bandwidth (kHz)	Measured Frequency (MHz)	Limit(MHz)
Low	2402	1170	2401.37	≥2400
High	2480	1170	2480.54	≤2483.5
Result: Pass				

Low Channel



High Channel



Note: Note: GFSK andJI/4DQPSK Mode was the worse case

Clause 4.3.1.9 Transmitter unwanted emissions in the out-of-band domain

Test method according to Clause 5.4.8.2.1

EUT	Bluetooth Speaker	Model	S156S
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

GFSK Mode

Channel Frequency		2402MHz (OCB:0.824MHz)		2480MHz (OCB: 0.824MHz)	
Test Condition		OOB Emission (MHz)		OOB Emission (MHz)	
		2399-2400	2398-2399	2483.5-2484.3	2484.3-2485.1
		Max. Power (dBm/MHz	Max. Power (dBm/MHz	Max. Power (dBm/MHz	Max. Power (dBm/MHz
T_{nor} 25℃	V_{nor} (V)	-44.25	-48.55	-46.37	-50.63
T_{min} -20℃	V_L (V)	-44.23	-48.51	-46.40	-50.58
T_{max} 40℃	V_L (V)	-44.29	-48.57	-46.43	-50.69
T_{min} -20℃	V_H (V)	-44.13	-48.43	-46.32	-50.51
T_{max} 40℃	V_H (V)	-44.36	-48.60	-46.45	-50.67
Limit (dBm)		-10	-20	-10	-20
Pass/Fail		Pass	Pass	Pass	Pass

JI/4DQPSK Mode

Channel Frequency		2402MHz (OCB:1.170MHz)		2480MHz (OCB: 1.170MHz)	
Test Condition		OOB Emission (MHz)		OOB Emission (MHz)	
		2398.83-2400	2397.66-2398.83	2483.5-2484.67	2484.67-2485.84
		Max. Power (dBm/MHz)	Max. Power (dBm/MHz)	Max. Power (dBm/MHz)	Max. Power (dBm/MHz)
T_{nor} 25℃	V_{nor} (V)	-45.22	-49.31	-47.44	-51.62
T_{min} -20℃	V_L (V)	-45.21	-49.36	-47.42	-51.70
T_{max} 40℃	V_L (V)	-45.32	-49.39	-47.49	-51.77
T_{min} -20℃	V_H (V)	-45.18	-49.28	-47.38	-51.65
T_{max} 40℃	V_H (V)	-45.27	-49.41	-47.51	-51.71
Limit (dBm)		-10	-20	-10	-20
Pass/Fail		Pass	Pass	Pass	Pass

Note: Note: GFSK andJI/4DQPSK Mode was the worse case

Clause 4.3.1.10 Transmitter unwanted emissions in the spurious domain

(Radiated)
Transmitter Operating

Note:

1. Measurements were done on low & high channels, but depicting the worst case are submitted in the report.
2. The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges.
3. The test frequency range is from 30M-12.75G and please see clause 5.4.9.2.2 of EN 300 328 for the test method.

Lowest Frequency （2402MHz）			Highest Frequency (2480MHz)		
f(MHz)	Band-Width (kHz)	Level (dBm)	f(MHz)	Band-Width (kHz)	Level (dBm)
4804	1000	-43.7	4960	1000	-45.0
Measurement Uncertainty		±6dB			

Limits Clause 4.3.1.10.3

Table 4: Transmitter limits for spurious emissions

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

Note: GFSK was the worse case

Clause 4.3.1.11 Receiver Spurious Emissions
(Radiated)

Note:

1. Measurements were done on low & high channels, but depicting the worst case are submitted in the report.
2. The receiver spurious emissions were done with different settings, using the relevant and pre-amplifiers for the relevant frequency ranges.
3. The test frequency range is from 30M-12.75G and please see clause 5.4.10.2.2 of EN 300 328 for the test method.

Low Channel			High Channel		
f(MHz)	Band-Width (kHz)	Level (dBm)	f(MHz)	Band-Width (kHz)	Level (dBm)
50.67	120	-71.5	50.67	120	-72.1
Measurement Uncertainty		±6dB			

Limits Clause 4.3.1.11.3

Table 5: Spurious emission limits for receivers

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

Clause 4.3.1.12 Receiver Blocking

Definition

Receiver blocking is a measure of the ability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation in the presence of an unwanted signal (blocking signal) on frequencies other than those of the operating band provided in table 1.

Performance Criteria

The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1.t)).

Limits

While maintaining the minimum performance criteria as defined in clause 4.3.1.12.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 6, table 7 or table 8.

Receiver Category 1

Table 6: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 6 dB	2 380 2 503,5	-53	CW
P_{min} + 6 dB	2 300 2 330 2 360	-47	CW
P_{min} + 6 dB	2 523,5 2 553,5 2 583,5 2 613,5 2 643,5 2 673,5	-47	CW
NOTE 1: P_{min} is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

Receiver Category 2

Table 7: Receiver Blocking parameters receiver category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 6 dB	2 380 2 503,5	-57	CW
P_{min} + 6 dB	2 300 2 583,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

Receiver Category 3

Table 8: Receiver Blocking parameters receiver category 3 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 12 dB	2 380 2 503,5	-57	CW
P_{min} + 12 dB	2 300 2 583,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

Test Configuration

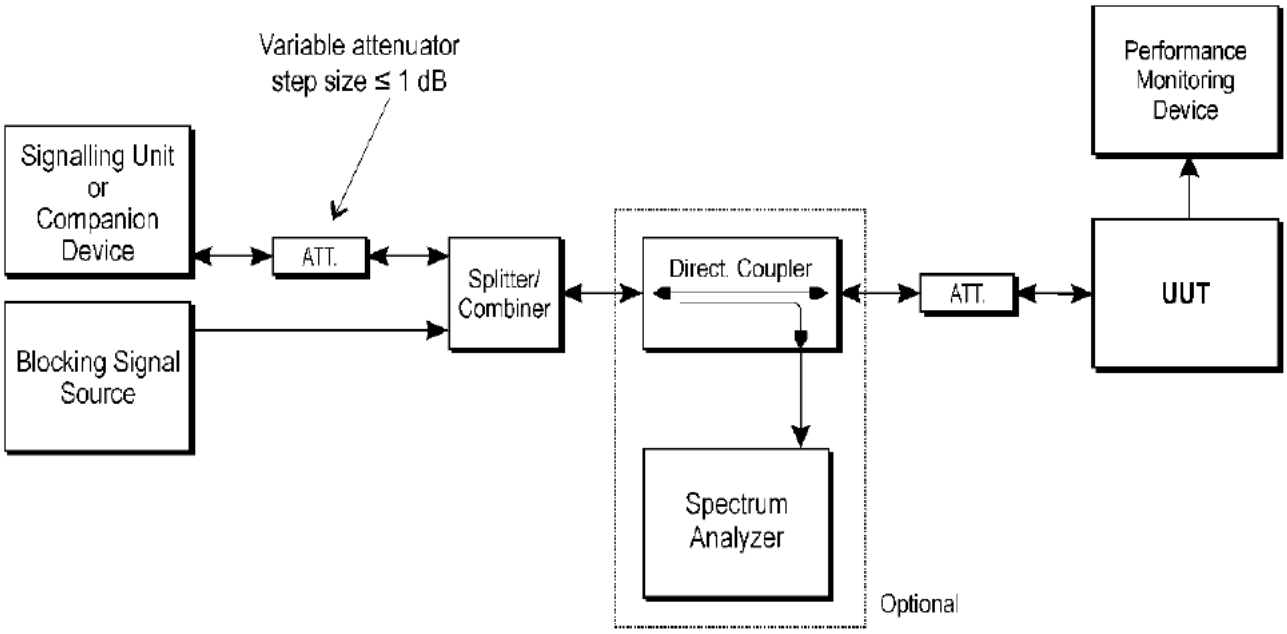


Figure 6: Test Set-up for receiver blocking

Test Method

For systems using multiple receive chains only one chain (antenna port) need to be tested. All other receiver inputs shall be terminated.

The procedure in step 1 to step 6 below shall be used to verify the receiver blocking requirement as described in clause 4.3.1.12 or clause 4.3.2.11.

Table 6, table 7 and table 8 in clause 4.3.1.12.4 contain the applicable blocking frequencies and blocking levels for each of the receiver categories for testing Receiver Blocking on frequency hopping equipment.

Table 14, table 15 and table 16 in clause 4.3.2.11.4 contain the applicable blocking frequencies and blocking levels for each of the receiver categories for testing Receiver Blocking on equipment using wide band modulations other than FHSS.

Step1:

• For non-frequency hopping equipment, the UUT shall be set to the lowest operating channel.

Step 2:

• The blocking signal generator is set to the first frequency as defined in the appropriate table corresponding to the receiver category and type of equipment.

Step 3:

• With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup shown in figure 6. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still met. The resulting level for the wanted signal at the input of the UUT is $P_{min.}$

• This signal level (P_{min}) is increased by the value provided in the table corresponding to the receiver category and type of equipment.

Step 4:

• The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is met.

Step 5:

• Repeat step 4 for each remaining combination of frequency and level for the blocking signal as provided in the table corresponding to the receiver category and type of equipment.

Step 6:

• For non-frequency hopping equipment, repeat step 2 to step 5 with the UUT operating at the highest operating channel.

Test Result

The EUT is regarded as category 2 Receiver

Hopping Mode

Wanted signal mean power from companion device(dBm)	Blocking signal frequency(MHz)	Blocking signal power(dBm)	PER	Result
-84.1dBm (Pmin) +6 dB	2380	-57	0%	Pass
-84.1dBm (Pmin) +6 dB	2503.5	-57	0%	Pass
-84.1dBm (Pmin) +6 dB	2300	-47	0%	Pass
-84.1dBm (Pmin) +6 dB	2583.5	-47	0%	Pass

3.0 Product Labelling

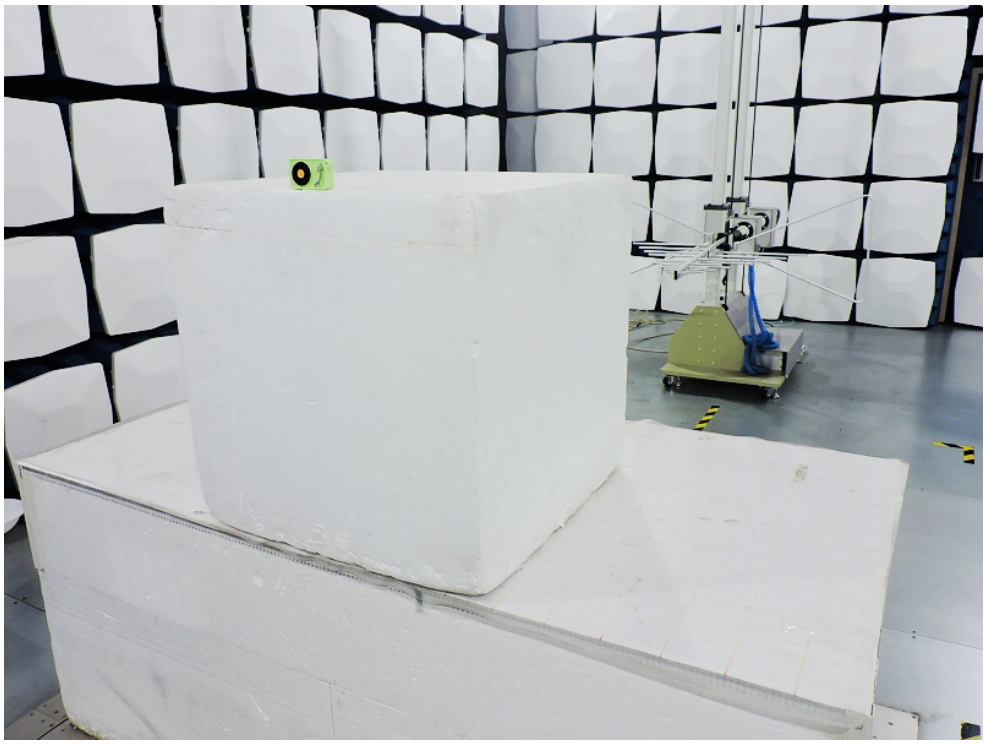
CE Mark label specification

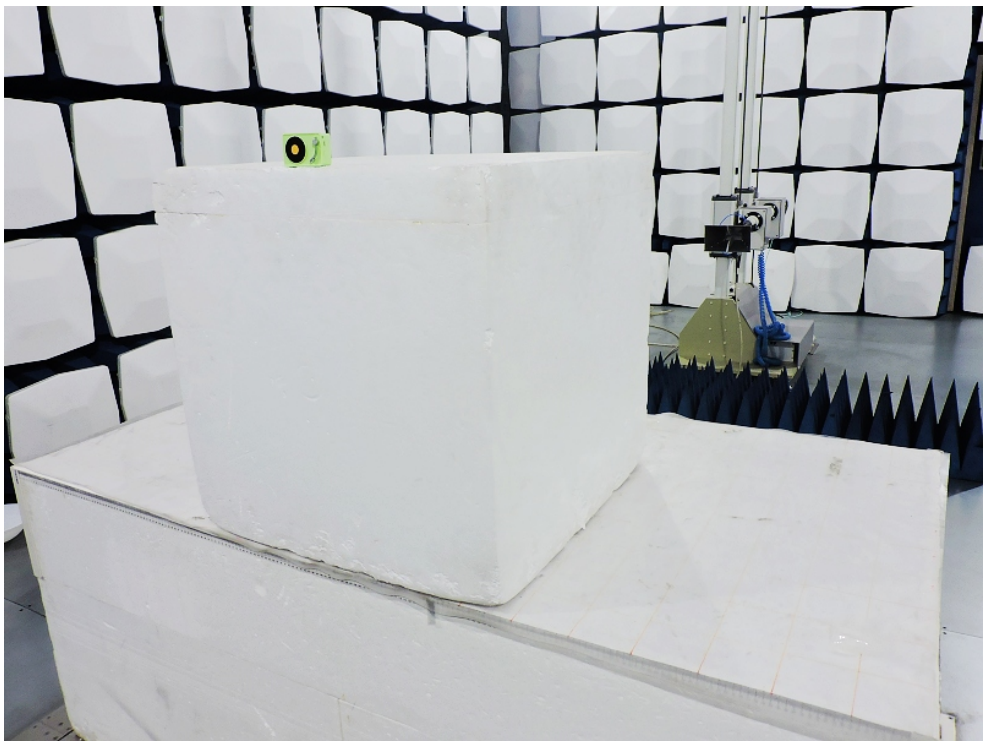
Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.

Mark Location: Rear enclosure

4. 0 Photographs – Test Setup

Spurious Radiated emission test view





5.0 Photographs – EUT

Please refer test report EMC2003020-01

6.0 Test Equipments

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2019-06-21	2020-06-20
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2019-06-21	2020-06-20
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2019-06-21	2020-06-20
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2019-06-21	2020-06-20
ESVB Test Receiver	ROHDE&SCHWARZ	ESVB	826156/011	2019-06-21	2020-06-20
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2019-06-21	2020-06-20
5K VA AC Power Source	California Instruments	5001iX	56060	2019-06-21	2020-06-20
CDN	EM TEST	CDN M2/M3	-	2019-06-21	2020-06-20
Attenuation	EM TEST	ATT6/75	-	2019-06-21	2020-06-20
Resistance	EM TEST	R100	-	2019-06-21	2020-06-20
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2019-06-21	2020-06-20
Inductive Components	EM TEST	MC2630	-	2019-06-21	2020-06-20
Antenna	EM TEST	MS100	-	2019-06-21	2020-06-20
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2019-08-22	2020-08-21
Power Amplifier	AR	150W1000	300999	2019-08-22	2020-08-21
Field probe	Holaday	HI-6005	105152	2019-08-22	2020-08-21
Bilog Antenna	Chase	CBL6111C	2576	2019-08-22	2020-08-21
Loop Antenna	EMCO	6507	00078608	2018-06-25	2021-06-24
Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2019-06-21	2020-06-20
966 Chamber	YIHENG	--	N/A	2018-02-07	2021-02-05
Vector Signal Generator	AGILENT	E4438C	MY49070163	2020-01-16	2021-01-15
Splitter	Mini-Circuits	ZAP-50W	NN256400424	2020-01-16	2021-01-15
Directional Coupler	AGILENT	87300C	MY44300299	2020-01-16	2021-01-15

vector Signal Generator	AGILENT	E4438C	US44271917	2020-01-16	2021-01-15
4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	AGILENT	U2531A	TW54063507	2020-01-16	2021-01-15
4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	AGILENT	U2531A	TW54063513	2020-01-16	2021-01-15
Splitter	Mini	PS3-7	4463	2020-01-16	2021-01-15
Spectrum Analyzer	AGILENT	E7405A	US44210471	2020-01-16	2021-01-15
Attenuator	Resnet	20dB	(n.a)	2020-01-16	2021-01-15
Signal Analyzer	AGILENT	N9010A	MY48030494	2020-01-16	2021-01-15
ESD Simulator	NoiseKen	ESS-2002	ESS06Y6394	2019-06-25	2020-06-24
Continuous Wave Simulator	EM TEST	CWS 500N	0704-05	2019-06-21	2020-06-20
Ultra Compact Simulator	EM TEST	UCS 500 M4	0304-42	2019-06-21	2020-06-20
Pre-Amplifier	HP	8447B	--	2019-09-18	2020-09-17
Horn Antenna	SchwarzBeck	BBHA9120D	01919	2018-07-09	2021-07-08
BiConiLog Antenna	SchwarzBeck	9163	1139	2018-07-04	2021-07-03
Pre-Amplifier	SchwarzBeck	BBV 9743	#218	2019-06-21	2020-06-20

7.0 Measurement Uncertainty

Test Item	Uncertainty
Occupied Channel Bandwidth	±5%
RF output power, conducted	±5%
Power Spectral Density, conducted	±3dB
Unwanted Emissions, conducted	±3dB
All emissions, radiated	±6dB
Temperature	±3℃
Humidity	±5%
DC and low frequency voltages	±3%
Time	±5%
Duty Cycle	±5%

End of the Report