

Prüfbericht-Nr.: <i>Test report no.:</i>	50353282 001	Auftrags-Nr.: <i>Order no.:</i>	238110934	Seite 1 von 47 Page 1 of 47
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2019.10.08	
Auftraggeber: <i>Client:</i>	Sharp Corporation 1 Takumi-cho, Sakai-ku, Sakai City, Osaka, 590-8522, Japan			
Prüfgegenstand: <i>Test item:</i>	Sound Partner			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	AN-SS2			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C/ISED RSS-247 Test report (BDR/EDR)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247 ISED RSS-247 (02-2017)			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2019.10.15			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A001007048-003 A001007048-011			
Prüfzeitraum: <i>Testing period:</i>	2019.11.15 - 2020.03.27			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Bitte wählen / Please select...			
überprüft von: <i>reviewed by:</i>	☒ <u>Jack Chang</u>		genehmigt von: <i>authorized by:</i>	☒ <u>Arvin Ho</u>
Datum: 2020.03.28 <i>Date:</i>			Datum: 2020.03.28 <i>Date:</i>	
Stellung / Position:	Jack Chang/Project Manager		Stellung / Position:	Arvin Ho/Vice General Manager
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>				
Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
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. <i>This test report only 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 test mark.</i>				

V05

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 PEAK OUTPUT POWER

RESULT: Passed

5.1.3 20dB BANDWIDTH AND 99% BANDWIDTH

RESULT: Passed

5.1.4 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100kHz BANDWIDTH

RESULT: Passed

5.1.5 SPURIOUS EMISSION

RESULT: Passed

5.1.6 FREQUENCY SEPARATION

RESULT: Passed

5.1.7 NUMBER OF HOPPING FREQUENCY

RESULT: Passed

5.1.8 TIME OF OCCUPANCY

RESULT: Passed

5.1.9 MAINS CONDUCTED EMISSIONS

RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Passed

Contents

1.	GENERAL REMARKS	5
1.1	COMPLEMENTARY MATERIALS.....	5
1.2	DECISION RULE OF CONFORMITY.....	5
2.	TEST SITES	6
2.1	TEST LABORATORY	6
2.2	TEST FACILITY.....	6
2.3	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	7
2.4	TRACEABILITY	8
2.5	CALIBRATION	8
2.6	MEASUREMENT UNCERTAINTY	8
3.	GENERAL PRODUCT INFORMATION.....	9
3.1	PRODUCT FUNCTION AND INTENDED USE	9
3.2	SYSTEM DETAILS AND RATINGS.....	9
3.3	INDEPENDENT OPERATION MODES.....	11
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	12
3.5	SUBMITTED DOCUMENTS.....	12
4.	TEST SET-UP AND OPERATION MODES.....	13
4.1	PRINCIPLE OF CONFIGURATION SELECTION	13
4.2	TEST OPERATION AND TEST SOFTWARE.....	13
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	14
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	14
4.5	TEST SETUP DIAGRAM	14
5.	TEST RESULTS	16
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	16
5.1.1	<i>Antenna Requirement</i>	<i>16</i>
5.1.2	<i>Peak Output Power</i>	<i>17</i>
5.1.3	<i>20dB Bandwidth and 99% Bandwidth.....</i>	<i>19</i>
5.1.4	<i>Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth.....</i>	<i>27</i>
5.1.5	<i>Spurious Emission</i>	<i>36</i>
5.1.6	<i>Frequency Separation.....</i>	<i>37</i>
5.1.7	<i>Number of hopping frequency.....</i>	<i>39</i>
5.1.8	<i>Time of Occupancy</i>	<i>42</i>
5.1.9	<i>Mains Conducted Emissions.....</i>	<i>45</i>
6.	RADIO FREQUENCY EXPOSURE COMPLIANCE	46

Produkte
Products

Prüfbericht - Nr.: 50353282 001
Test Report No.

Seite 4 von 47
Page 4 of 47

6.1.1	Electromagnetic Fields.....	46
7.	LIST OF TABLES	47

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation

(File Name: 50353282 001 APPENDIX P)

Appendix D: Test Result of Radiated Emissions

(File Name: 50353282 001 APPENDIX D)

Appendix X: Photographs of the Test Set-Up

(File Name: 50353282 001 APPENDIX X)

Test Specifications

The following standards were applied

Table 1: Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247
FCC 47CFR Part 2: Subpart J Section 2.1093
ISED RSS-247 Issue 2, Feb 2017
ISED RSS-102 Issue 5, March 2015
ISED RSS-Gen, Issue 5, March 2019
ANSI C63.10:2013
KDB558074 D01 DTS Meas Guidance v05r02
KDB447498 D01 General RF Exposure Guidance v06

1.2 Decision Rule of conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.

AC Mains Conduction:
11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)
FCC Registration No.: 180491
IC Canada Registration No.: 9465A

Radiated Test/Conducted Test:
No. 458-18, Sec 2, Fenliao., Linkou Dist.
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
IC Canada Registration No.: 25563

TAF Accredited NCC Test Lab. No.:3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022



Testing Laboratory
3567

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESR7	102108	2019/4/17	2020/4/16
Spectrum Analyzer	R&S	*FSV40	101112	2019/10/15	2020/10/15
Pre-Amplifier	Agilent	8447D	2944A10772	2019/2/22 2020/2/11	2020/2/21 2021/2/10
Pre-Amplifier	EMCI	EMC051845SE	980633	2019/2/25 2020/2/17	2020/2/24 2021/2/16
Pre-Amplifier	EMCI	EMC184045SE	980657	2019/2/23 2020/2/17	2020/2/22 2021/2/16
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2019/1/14	2020/1/13
Horn Antenna	ETS-Lindgren	3117	00218930	2018/12/27 2019/12/6	2019/12/26 2020/12/5
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2019/4/12	2020/4/11
Loop Antenna	SCHWARZBECK	FMZB 1513	1513-076	2019/07/11	2020/07/11
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Cable	HUBER+SUHNER	SUCOFLEX 104EA 9k~18G	800056/4EA	2019/4/18	2020/4/17
Test Cable	HUBER+SUHNER	SUCOFLEX 104 9k~18G	804680/4	2019/4/18	2020/4/17
Test Cable	HUBER+SUHNER	SUCOFLEX 104 9k~18G	MY37202/4	2019/4/18	2020/4/17
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA 1G~40G	800898/2EA	2019/4/18	2020/4/17
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA 1G~40G	800901/2EA	2019/4/18	2020/4/17
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA 1G~40G	801027/2EA	2019/4/18	2020/4/17
Thermo Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-010	2019/4/16	2020/4/15
Signal Generator	R&S	SMB100A03	181335	2019/1/23 2020/1/18	2020/1/22 2021/1/17
Power Meter	Anritsu	ML2495A	1901008	2019/4/29	2020/4/28
Power Sensor	Anritsu	MA2411B	1725269	2019/4/29	2020/4/28
EXG-B RF Analog Signal Generator	Agilent	N5171B	MY53050377	2019/04/22	2020/04/21
MXG-B RF Vector Signal Generator	Agilent	N5182B	MY53050524	2019/04/22	2020/04/21
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100797	2019/02/20	2020/02/20
Two-Line V-Network (for EUT)	Rohde & Schwarz	ENV216	101243	2019/06/23	2020/06/23
Two-Line V-Network	Rohde & Schwarz	ENV216	101262	2019/07/16	2020/07/16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	0357.8810.54- 102102-HN	2019/07/25	2020/07/25
Test Software	Audix	e3	Ver. 9	N/A	N/A

*The test date of 99% bandwidth is 27-Mar-2020, the testing period of other item is 15-Nov-2019 to 27-Nov-2019.

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements:

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 0.1 ppm
RF power, conducted	± 1.5 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 °C
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Bluetooth Headset. It contains a Bluetooth compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Sound Partner
Type Identification	AN-SS2
FCC ID	APYTCG00043
Canada ID	548D-AVT003
HVIN	AN-SS2

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	2402 MHz ~ 2480 MHz
Channel Spacing	1 MHz
Channel number	79
Operation Voltage	3.7Vdc
Modulation	GFSK, $\pi/4$ DQPSK, 8 DPSK
Antenna gain	5.14 dBi

Table 6: Frequency hopping information

Technical Specification	Description
Hopping Range	Hereby we declare that the maximum frequency of this device is: 2402-2480MHz. This is according the Bluetooth Core Specification V2.1+EDR for devices which will be operated in the USA. This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04).
Hopping Sequence	Example of a 79 hopping sequence in data mode: 33,04,21,44,23,42,53,46,55,48,40,59,72,29,76,31,08,73,07,75,09,45,60,39,58,13,47,11,77,52,35,50,65,54,67,56,69,62,71,64, 7,25,27,66,57,70,74,61,78,63,10,41,05,43,15,44,64,68,02,70,06,01,51,03,55,05,03,66,53,49,36,47,
Receiver input bandwidth	The input bandwidth of the receiver is 1MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings. Repeating of a packer has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

3.3 Independent Operation Modes

The basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Receiving
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- C. Hopping

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The test modes were adapted accordingly in reference to the instructions for use.

During testing, Channel and 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 selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Table 7: Table for Parameters of Test Software Setting

Mode	Channel Frequency		
	2402 MHz	2441 MHz	2480 MHz
DH5	4	4	4
3DH5	4	4	4

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

Test software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

The samples were used as follows:

Conducted: A001007048-011

Radiation: A001007048-003

Full test was applied on all test modes, but only worst case was shown.

Test Software	bluesuite.win.2.6.9
----------------------	---------------------

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

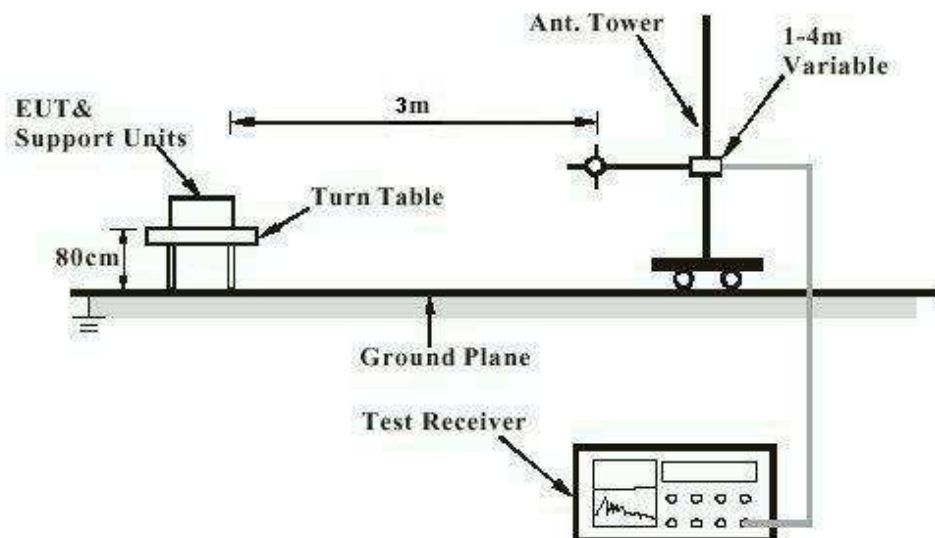
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested containing the noise suppression parts as in the Photo Appendix and the Test Setup Photos. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement

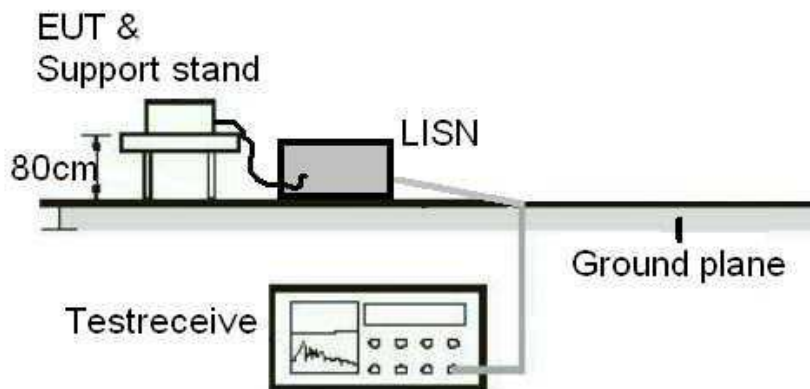
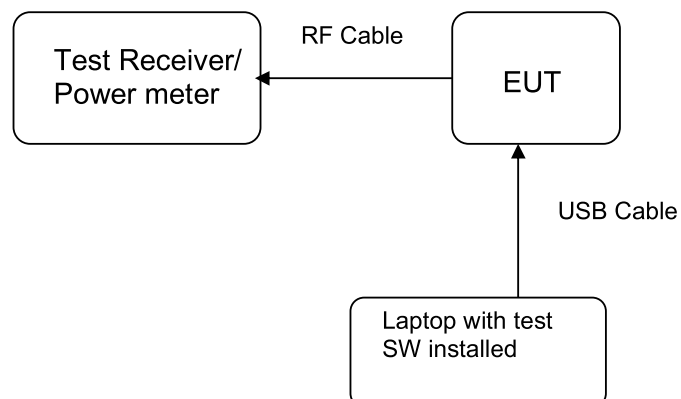


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and ISSED RSS-Gen 6.8
Requirement	:	use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 5.14dBi . The antenna is a printed PCB trace with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Peak Output Power

RESULT:
Passed

Test standard : FCC Part 15.247(b)(1), ISED RSS-247 5.4(b)

Basic standard : ANSI C63.10:2013

Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A

Ambient temperature : 22-26 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 8: Test result of Peak Output Power, DH5

Channel	Channel Frequency	Peak Output Power		Average Output Power	Limit
	(MHz)	(dBm)	(W)	(W)	(W)
Low Channel	2402	0.52	0.00113	0.00107	0.125
Middle Channel	2441	2.87	0.00194	0.00189	0.125
High Channel	2480	4.74	0.00298	0.00291	0.125

Pmax: 2.98mW

Table 9: Test result of Peak Output Power, 2DH5

Channel	Channel Frequency	Peak Output Power		Average Output Power	Limit
	(MHz)	(dBm)	(W)	(W)	(W)
Low Channel	2402	-0.98	0.00080	0.00046	0.125
Middle Channel	2441	2.07	0.00161	0.00101	0.125
High Channel	2480	4.05	0.00254	0.00166	0.125

Pmax: 2.54mW

Table 10: Test result of Peak Output Power, 3DH5

Channel	Channel Frequency	Peak Output Power		Average Output Power	Limit
	(MHz)	(dBm)	(W)	(W)	(W)
Low Channel	2402	-0.53	0.00089	0.00046	0.125
Middle Channel	2441	2.32	0.00171	0.00102	0.125
High Channel	2480	4.25	0.00266	0.00167	0.125

Pmax: 2.66mW

5.1.3 20dB Bandwidth and 99% Bandwidth

RESULT:
Passed

Test standard : FCC Part 15.247(a)(1), ISSED RSS-247 5.1(a),
 ISSED RSS-Gen
 Basic standard : ANSI C63.10:2013,
 ISSED RSS-Gen
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A

 Ambient temperature : 22-26°C
 Relative humidity : 50-65%
 Atmospheric pressure : 100-103kPa

Table 11: Test result of 20dB Bandwidth, DH5

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2402	1.1119	1.5	Pass
Mid Channel	2441	1.1119	1.5	Pass
High Channel	2480	1.1209	1.5	Pass

Table 12: Test result of 20dB Bandwidth, 3DH5

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2402	1.3756	1.5	Pass
Mid Channel	2441	1.3846	1.5	Pass
High Channel	2480	1.3876	1.5	Pass

If the carrier separation frequency of a Bluetooth Device is set at 1 MHz due to the firmware setting and the Bluetooth Standard, then for power <125 mW the limit for the 20 dB Bandwidth, becomes 1 MHz / 0.66666 = 1.5 MHz.

Table 13: Test result of 99% Bandwidth, DH5

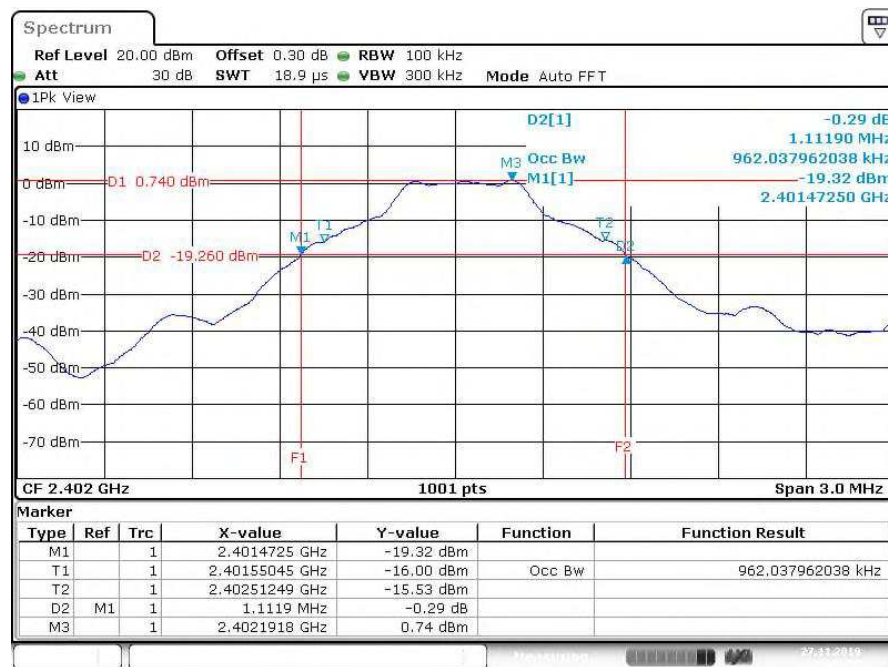
Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)
Low Channel	2402	872.648
Mid Channel	2441	868.306
High Channel	2480	876.989

Table 14: Test result of 99% Bandwidth, 3DH5

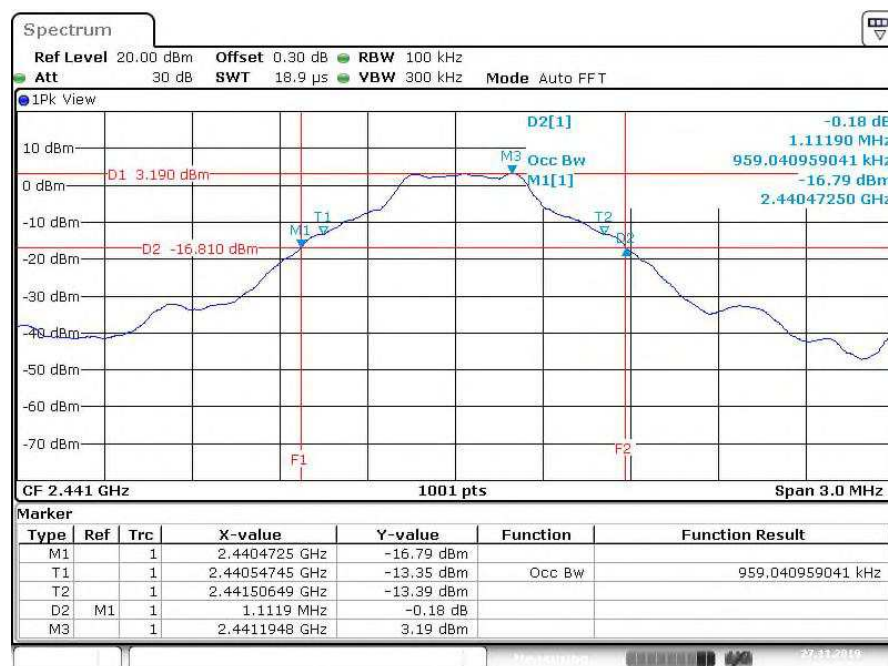
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2402	1.1635
Mid Channel	2441	1.1765
High Channel	2480	1.1895

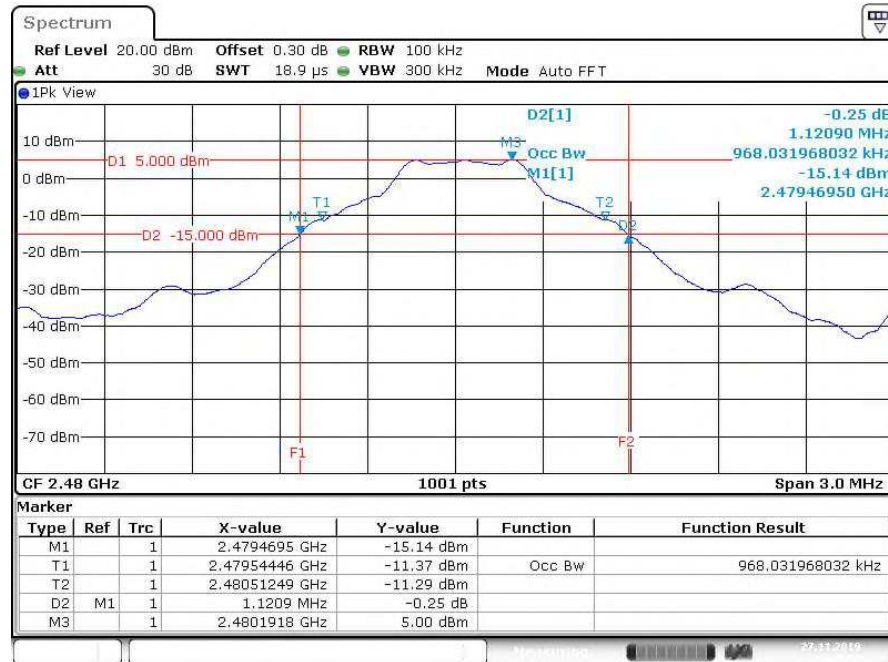
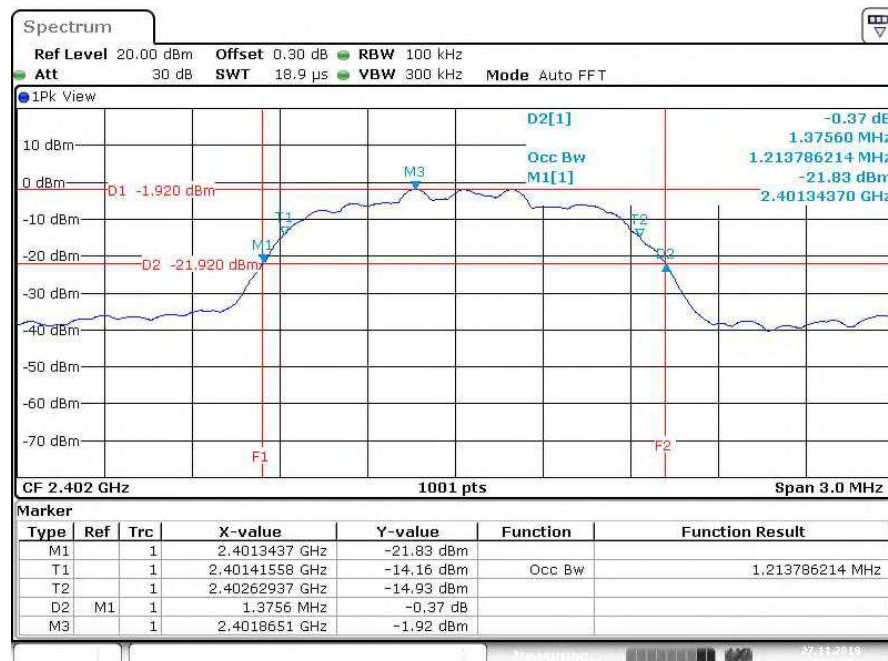
Test Plot of 20dB Bandwidth, DH5

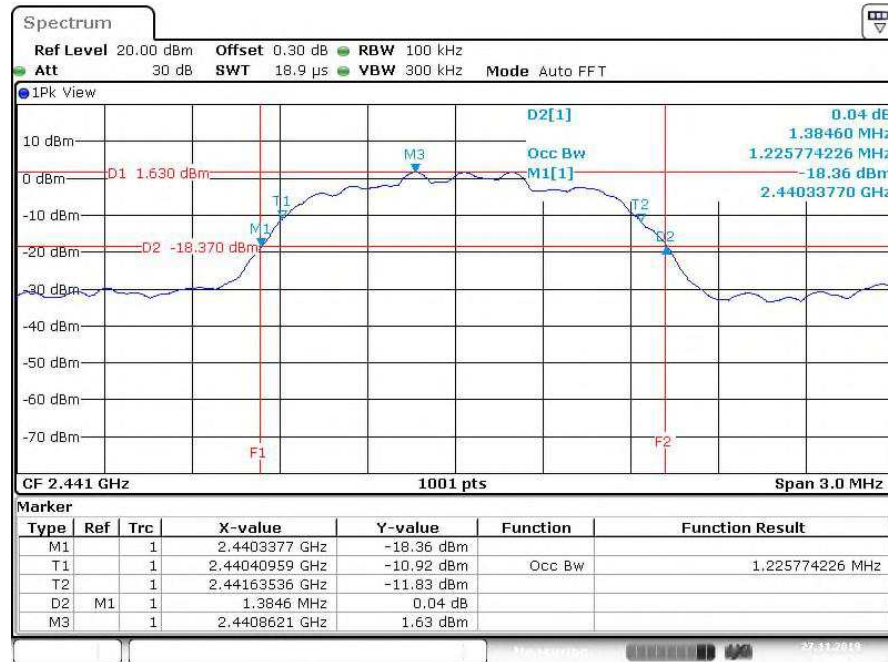
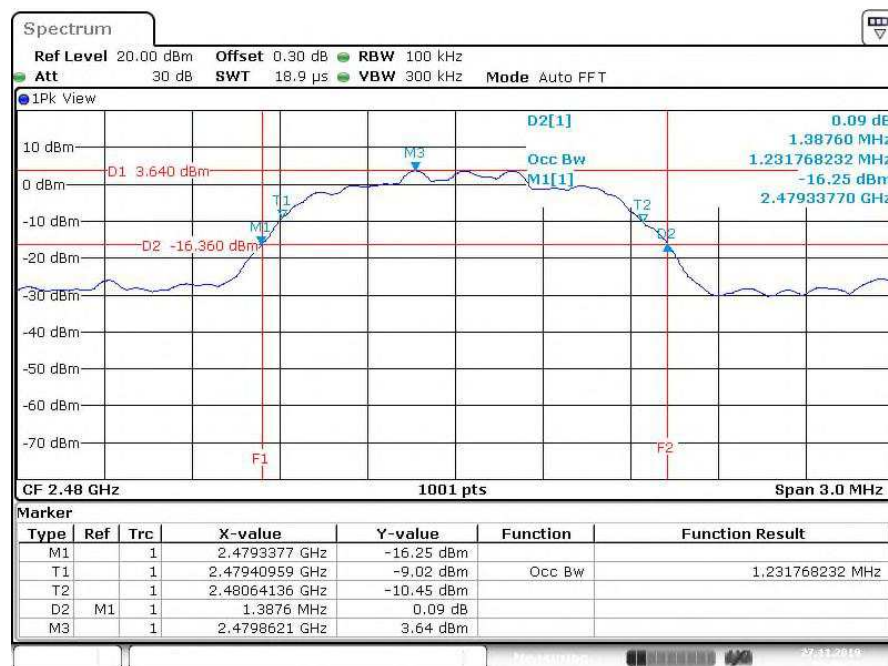
Low Channel



Middle Channel



High Channel

Test Plot of 20dB Bandwidth, 3DH5
Low Channel


Middle Channel

High Channel


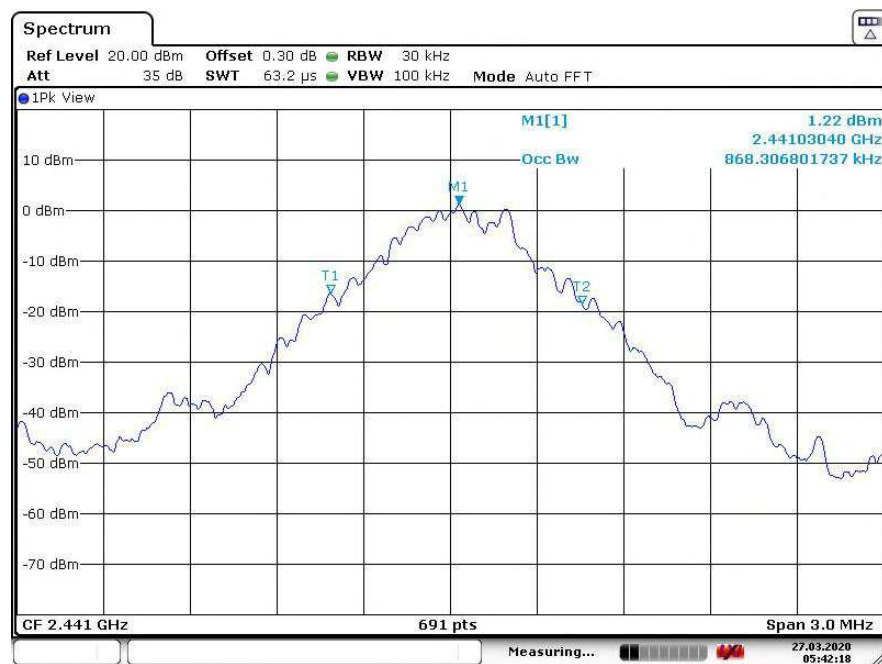
Test Plot of 99% Bandwidth, DH5

Low Channel



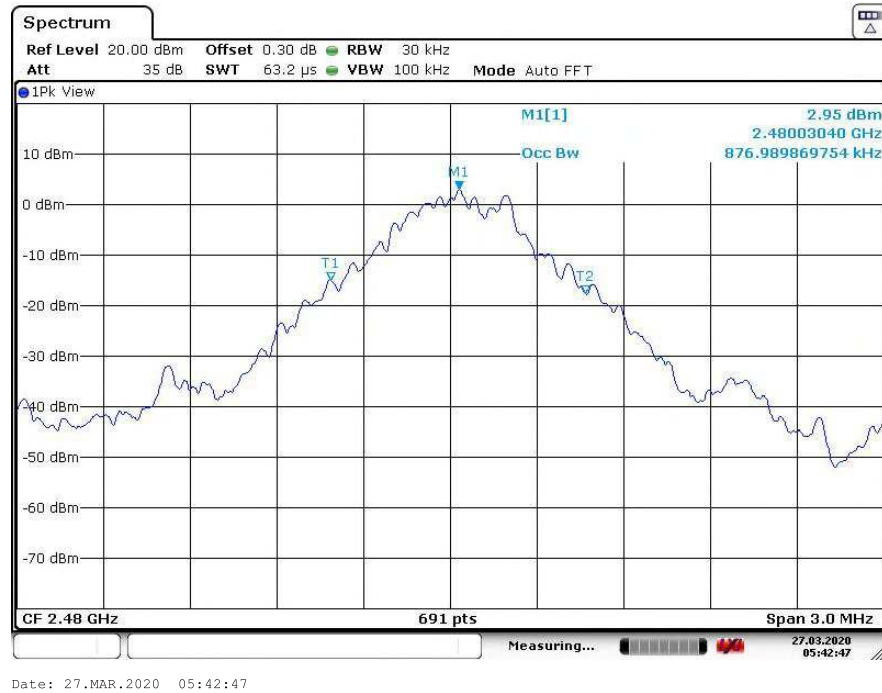
Date: 27.MAR.2020 05:41:46

Middle Channel



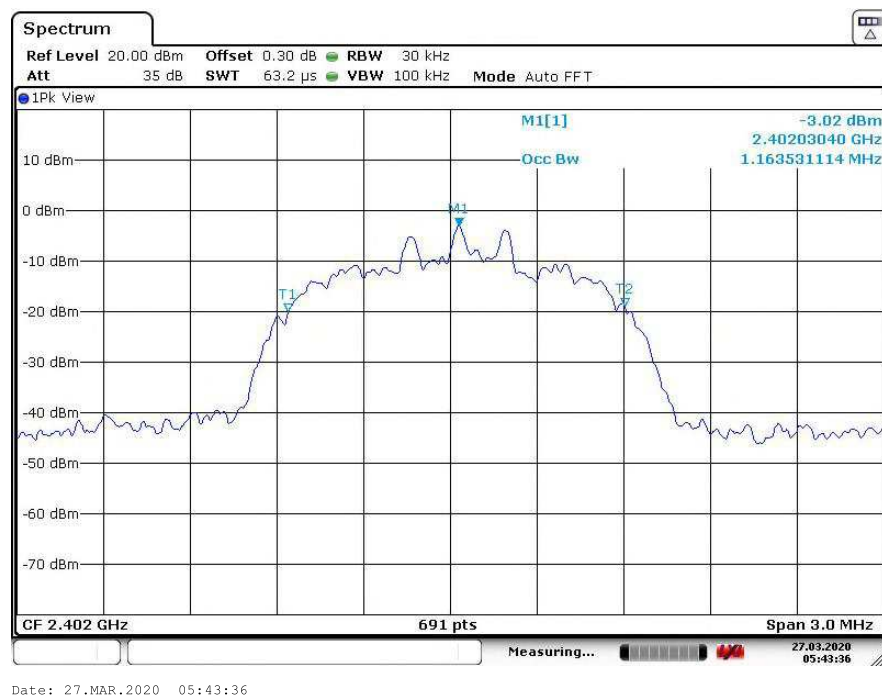
Date: 27.MAR.2020 05:42:18

High Channel

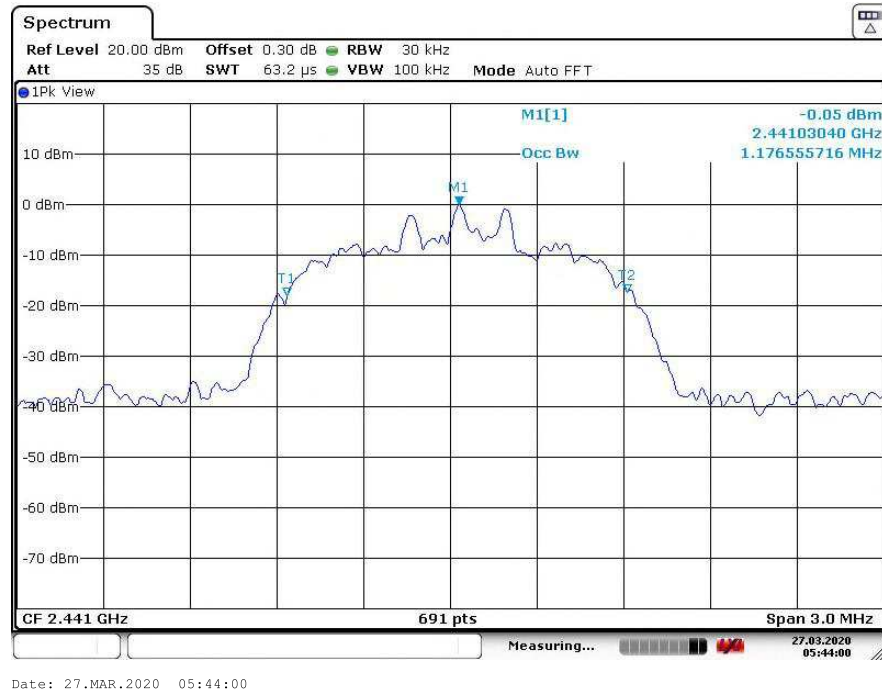


Test Plot of 99% Bandwidth, 3DH5

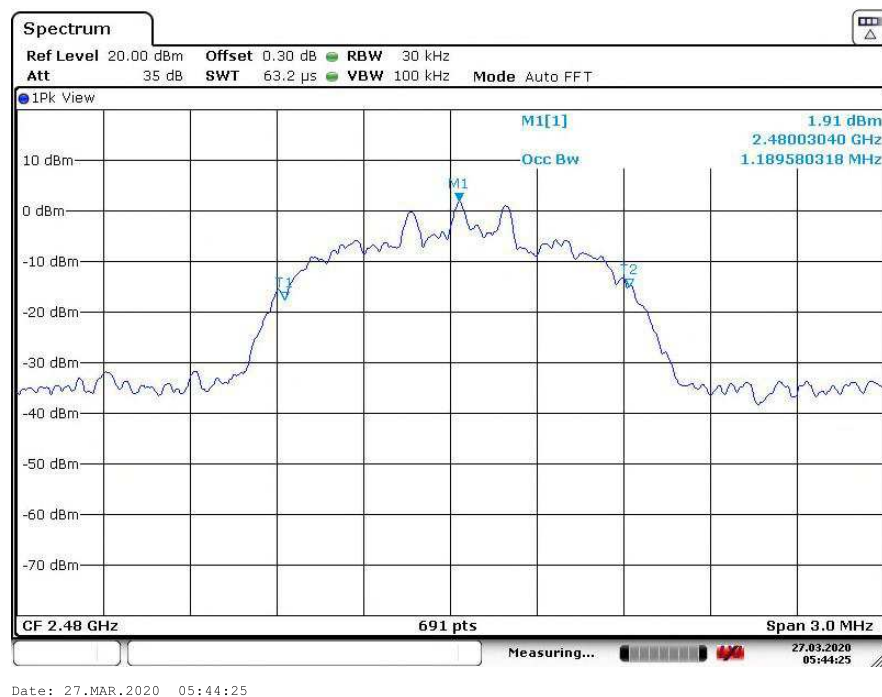
Low Channel



Middle Channel



High Channel



5.1.4 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth**RESULT:****Passed**

Test standard	:	FCC part 15.247(d), ISED RSS-247 5.5
Basic standard	:	ANSI C63.10:2013
Limit	:	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

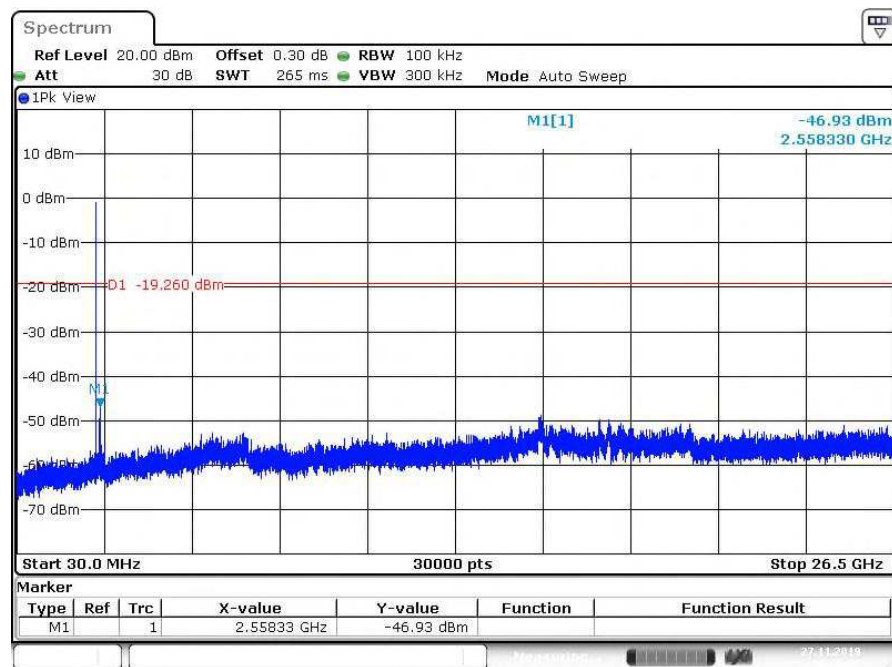
Test Channel	:	Low/ Middle/ High for Conducted Spurious Emissions Low/ High/ Hopping on for Frequency Band Edge
Operation Mode	:	A, C
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.

Due to the small size of the RF circuit and that there are no inductive components of significant size connected to the antenna port, 9kHz to 30MHz frequency range is not tested based on technical judgment.

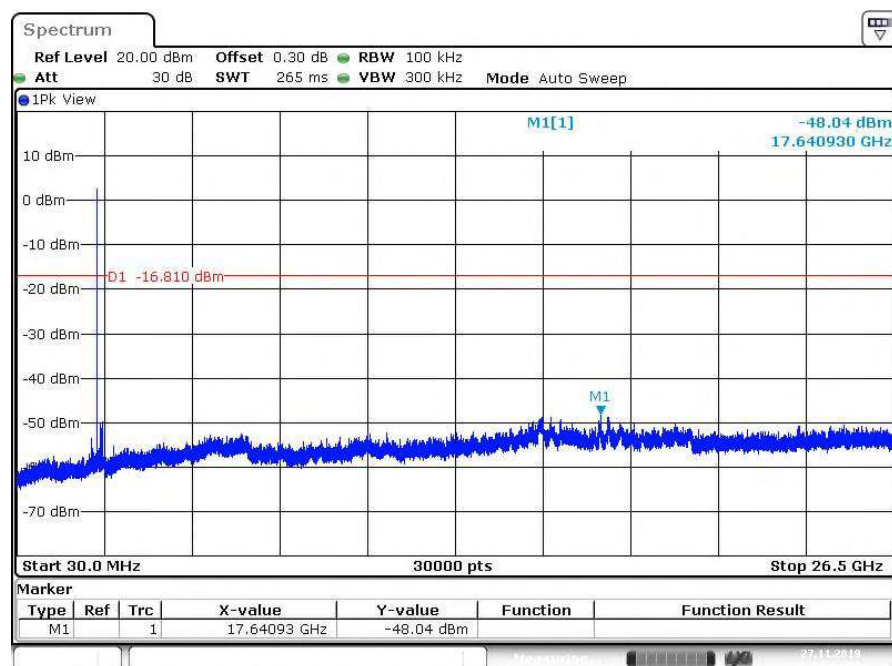
Test Plot of 100kHz Conducted Emissions, DH5

Low Channel



Date: 27.NOV.2019 10:35:31

Middle Channel



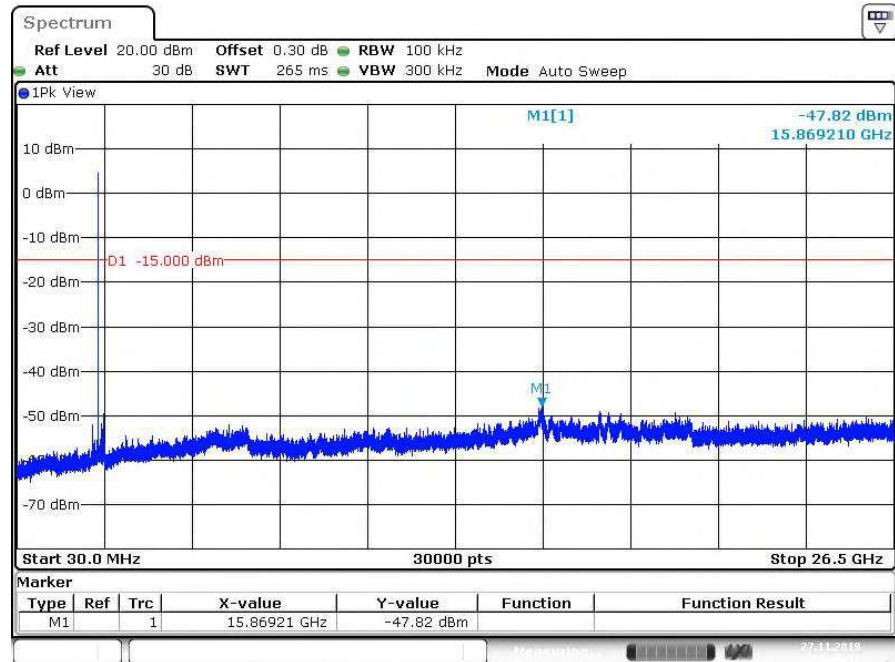
Date: 27.NOV.2019 10:32:59

Produkte
Products

Prüfbericht - Nr.: 50353282 001
Test Report No.

Seite 29 von 47
Page 29 of 47

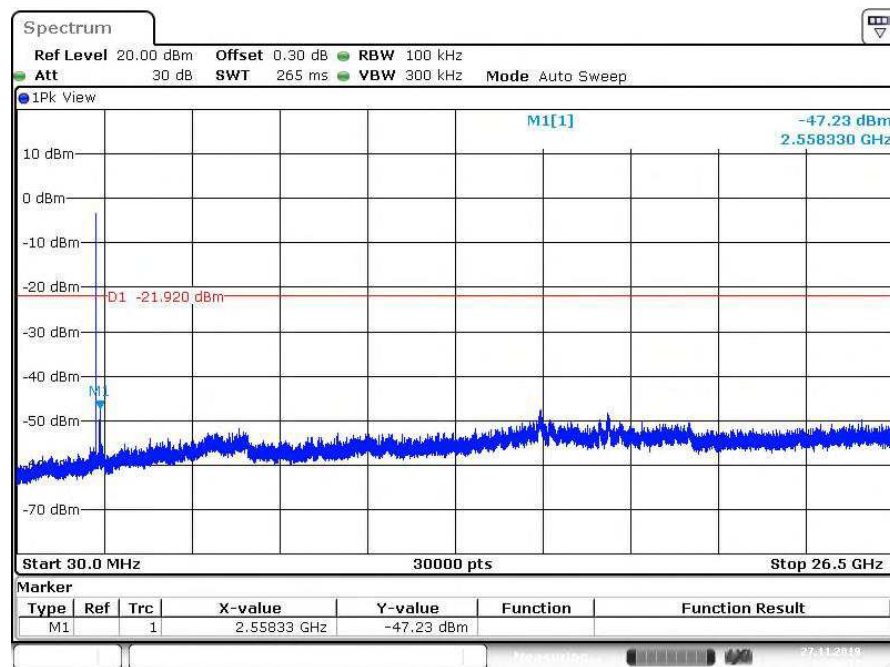
High Channel



Date: 27.NOV.2019 10:45:17

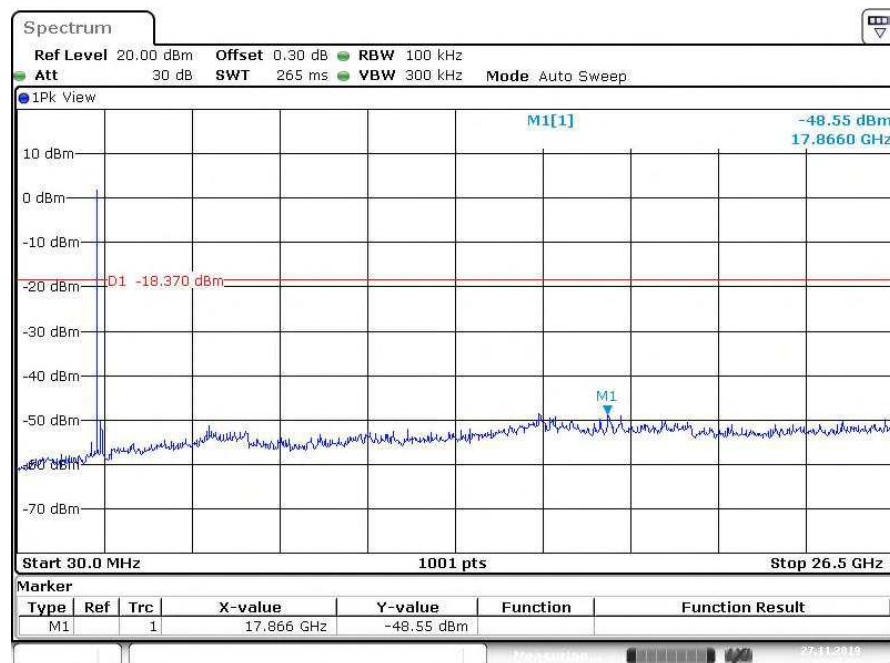
Test Plot of 100kHz Conducted Emissions, 3DH5

Low Channel



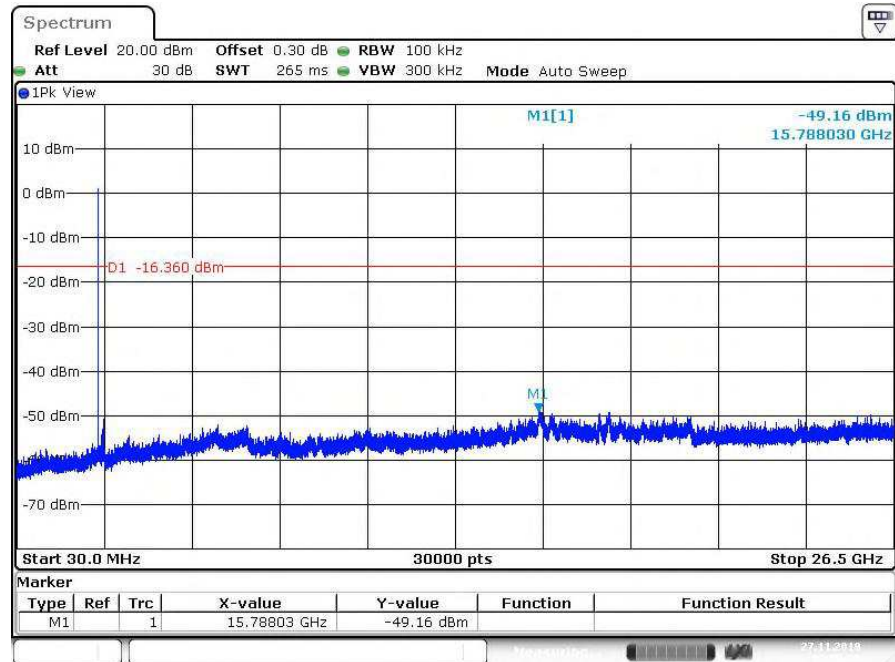
Date: 27.NOV.2019 12:36:16

Middle Channel



Date: 27.NOV.2019 12:40:52

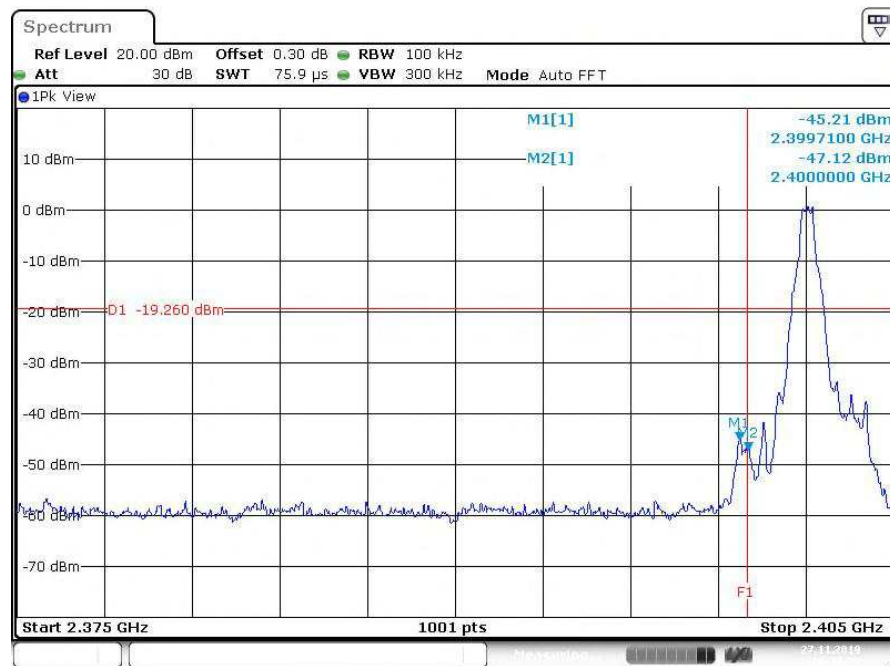
High Channel



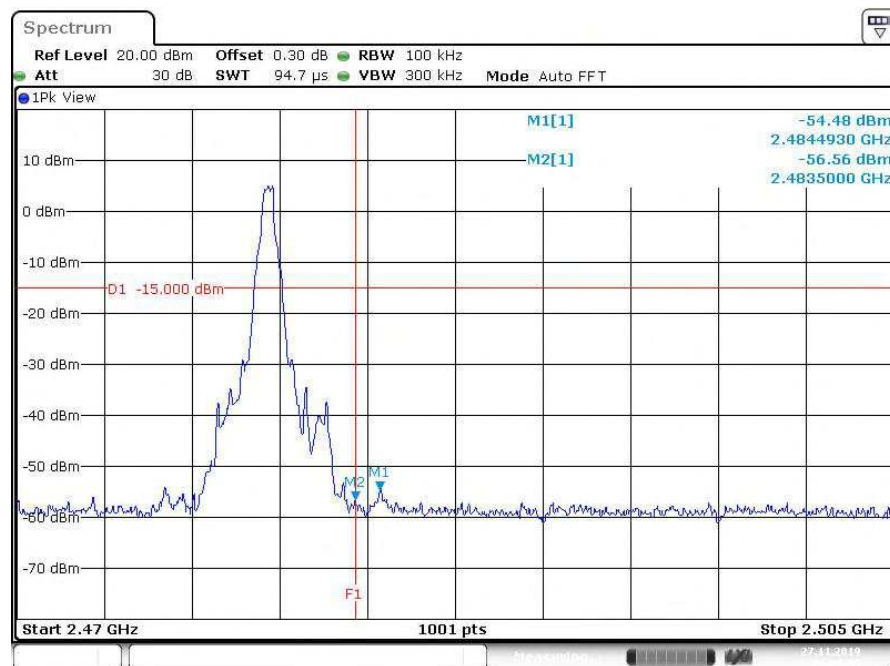
Date: 27.NOV.2019 12:55:28

Test Plot of 100kHz Bandwidth of Frequency Band Edge, DH5

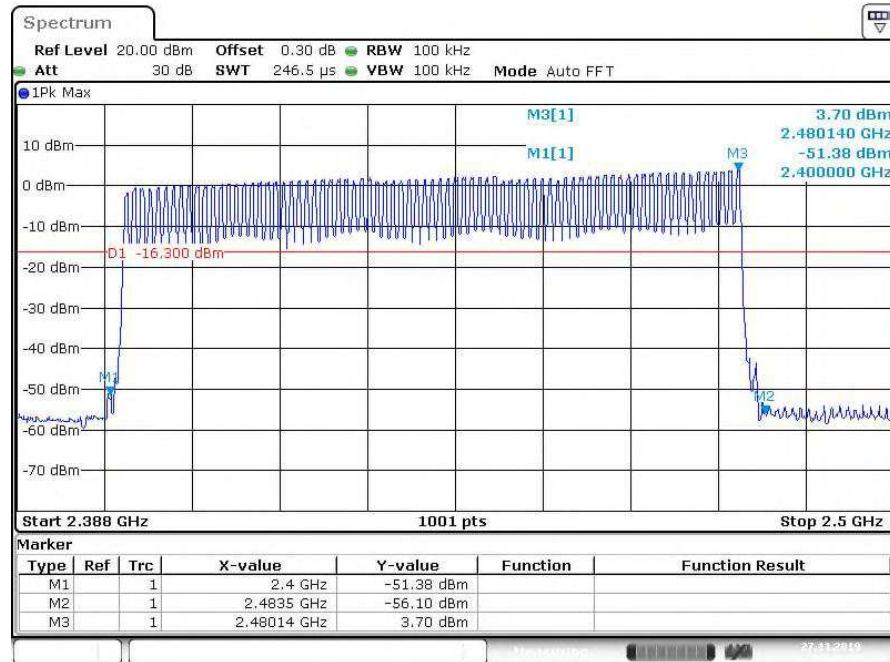
Low Channel



High Channel



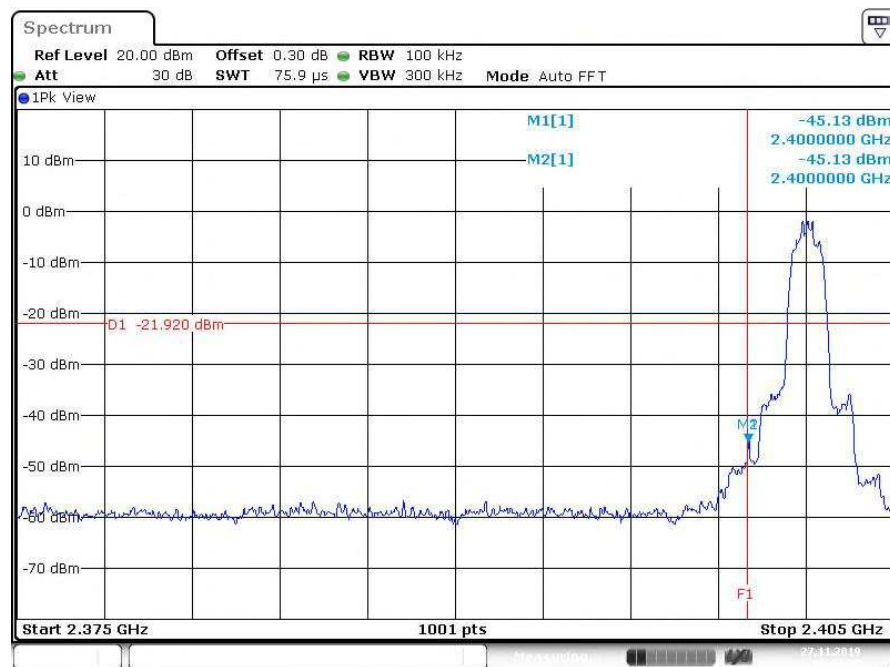
Hopping



Date: 27.NOV.2019 13:47:46

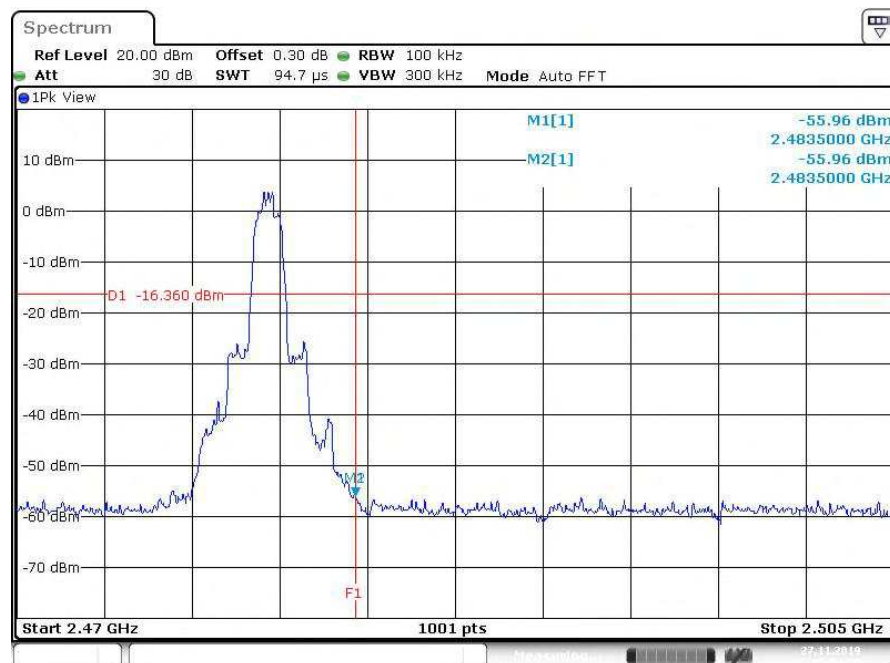
Test Plot of 100kHz Bandwidth of Frequency Band Edge, 3DH5

Low Channel



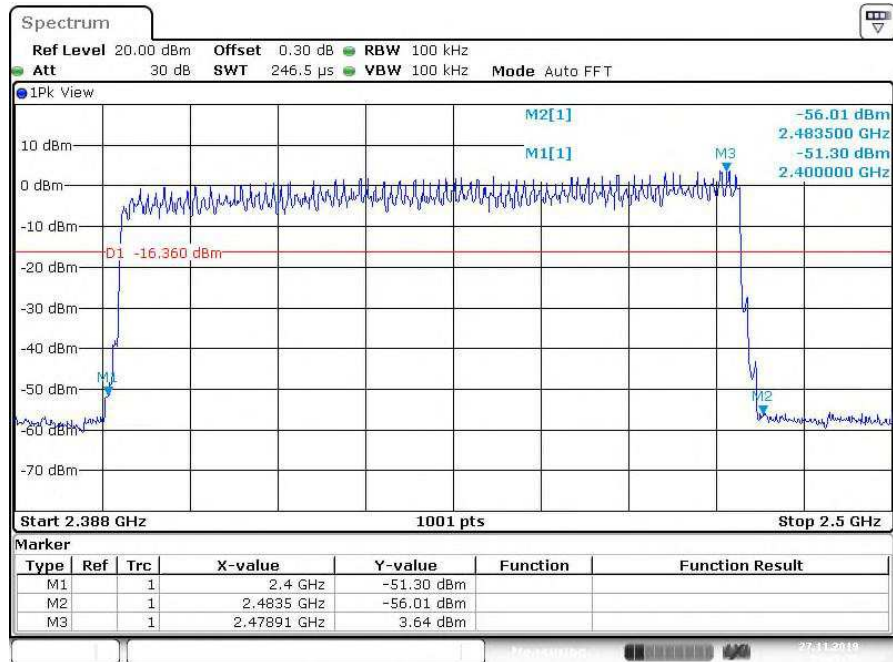
Date: 27.NOV.2019 12:35:32

High Channel



Date: 27.NOV.2019 12:54:46

Hopping



Date: 27.NOV.2019 13:31:15

5.1.5 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209 and ISED RSS-Gen 8.9, ISED RSS-Gen 8.10
Basic standard	:	ANSI C63.10: 2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and ISED RSS-Gen i5, 8.10 (Table 7), must comply with the radiated emission limits specified in FCC 15.209(a) and ISED RSS-Gen 5, 8.9 (Table 5 and 6). Emission radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in FCC15.247(d) and ISED RSS-247 i2, 5.5
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

For details refer to Appendix D.

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

Testing was carried out within frequency range 9kHz to the tenth harmonic. For details refer to Appendix D. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

5.1.6 Frequency Separation

RESULT:
Passed

Test standard	:	FCC part 15.247(a)(1), ISSED RSS-247 5.1(b)
Basic standard	:	ANSI C63.10:2013
Limit	:	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Hopping On
Operation Mode	:	C
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

Table 15: Test result of Frequency Separation, DH5

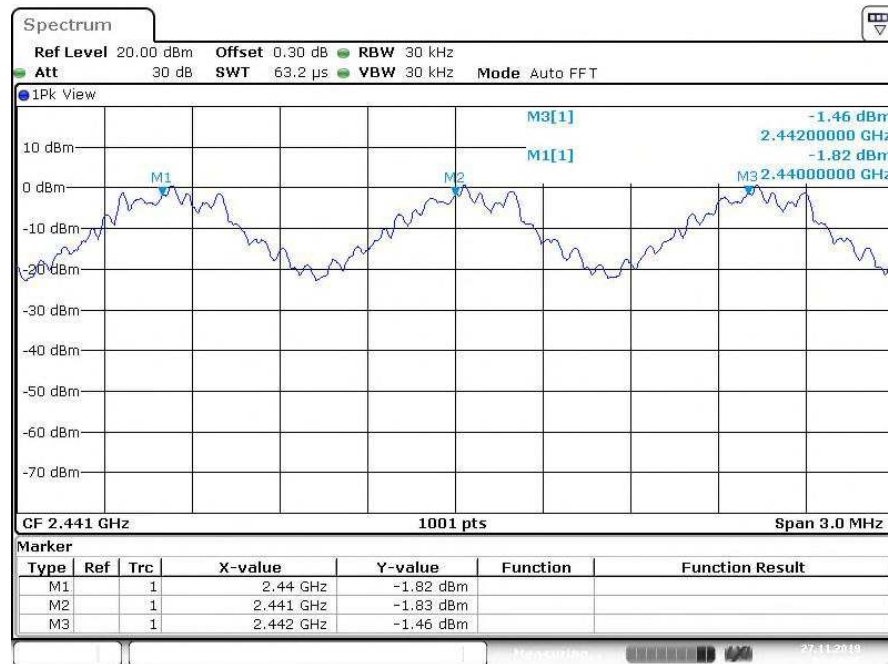
Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
Record Channel	2441	1	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth	Pass
Record Channel adj 1	2440			
Record Channel adj 2	2442			

Table 16: Test result of Frequency Separation, 3DH5

Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
Record Channel	2441	1	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth	Pass
Record Channel adj 1	2440			
Record Channel adj 2	2442			

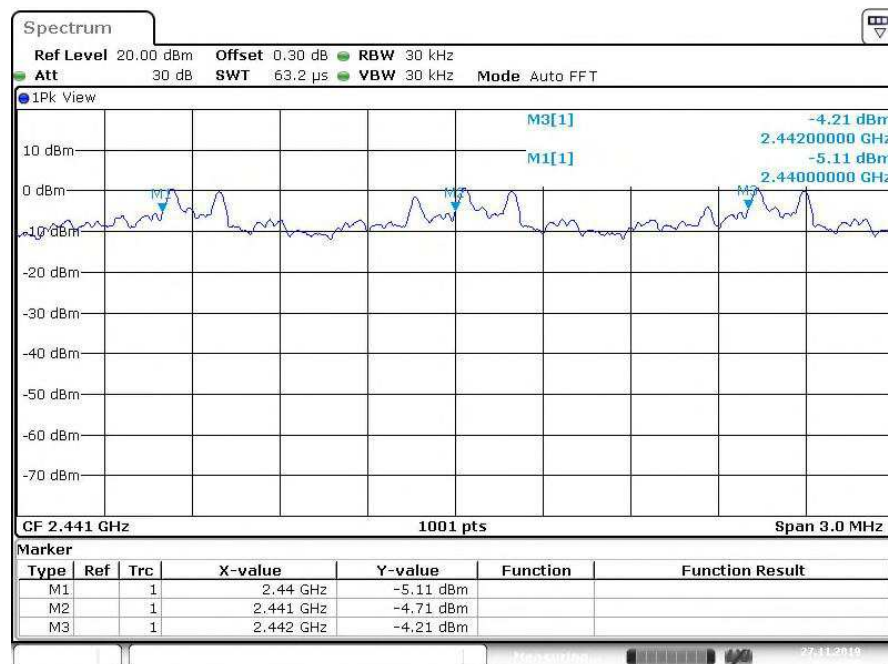
Test Plot of Frequency Separation

DH5



Date: 27.NOV.2019 13:24:47

3DH5



Date: 27.NOV.2019 13:26:56

5.1.7 Number of hopping frequency

RESULT:
Passed

Test standard : FCC part 15.247(a)(1)(iii), ISSED RSS-247 5.1(e)
 Basic standard : ANSI C63.10:2013
 Kind of test site : Shielded room

Test setup

Test Channel : Hopping On
 Operation Mode : C
 Ambient temperature : 22-26°C
 Relative humidity : 50-65%
 Atmospheric pressure : 100-103 kPa

Table 17: Test result of Number of hopping frequency, DH5

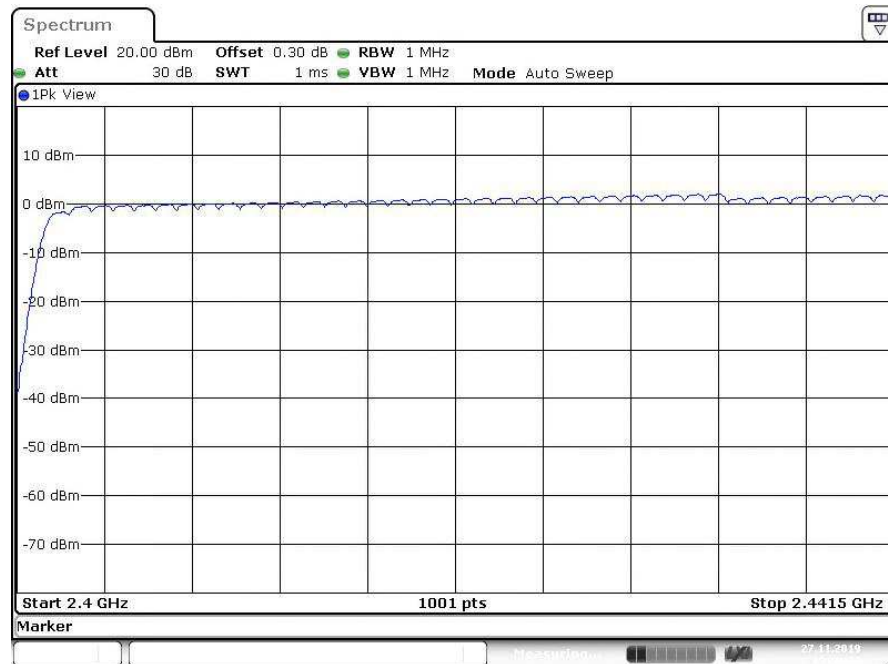
Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
<u>2400</u> to <u>2483.5</u> MHz	79	≥15	Pass

Table 18: Test result of Number of hopping frequency, 3DH5

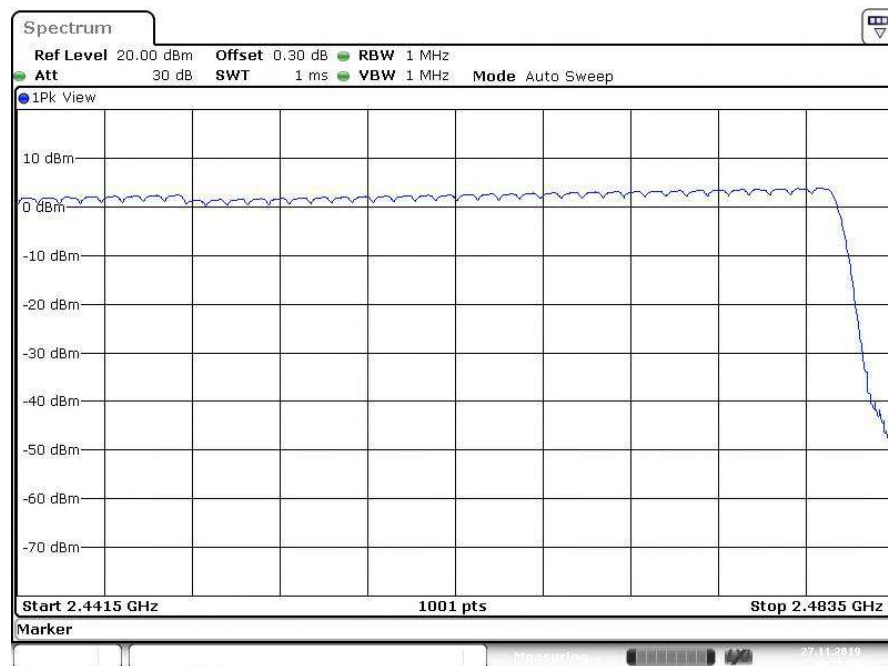
Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
<u>2400</u> to <u>2483.5</u> MHz	79	≥15	Pass

Test Plot of Number of hopping frequencies

DH5

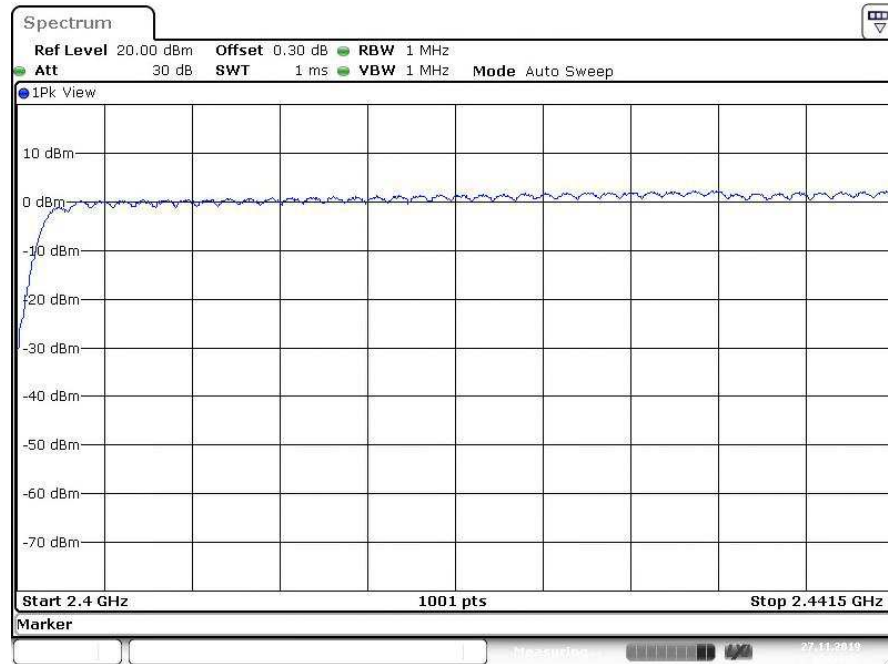


Date: 27.NOV.2019 13:50:34

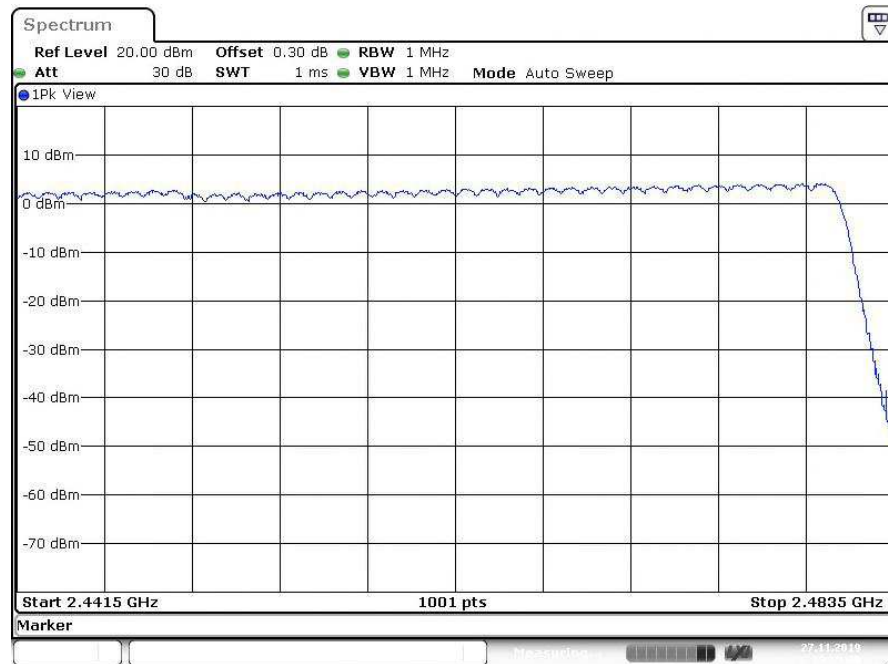


Date: 27.NOV.2019 13:51:27

3DH



Date: 27.NOV.2019 13:54:12



Date: 27.NOV.2019 13:53:39

5.1.8 Time of Occupancy

RESULT:**Passed**

Test standard : FCC part 15.247(a)(1)(iii), ISSED RSS-247 5.1(e)
Basic standard : ANSI C63.10:2013
Limits : 0.4s
Kind of test site : Shield room

Test setup

Test Channel : Low
Operation Mode : A

Ambient temperature : 22-26°C
Relative humidity : 50-65%
Atmospheric pressure : 100-103 kPa

Table 19: Test result of Time of Occupancy

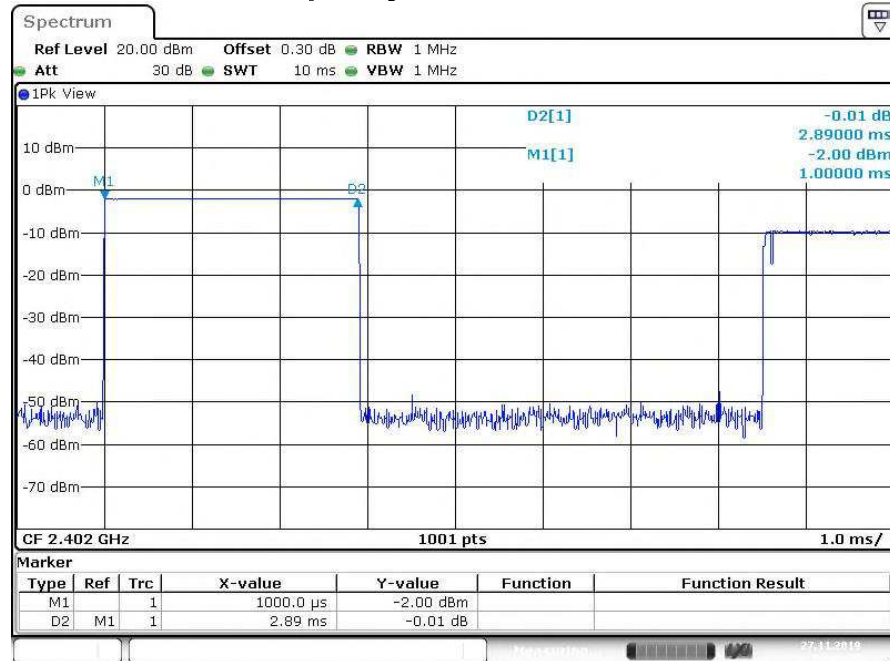
Data Mode	Captured Burst (s)	Dwell time (s)	On+Off time (s)	Limit (s)	Result
DH5	0.00289	0.3087	0.00753	0.4	Pass
3DH5	0.00288	0.3076	0.00754	0.4	Pass

Note:

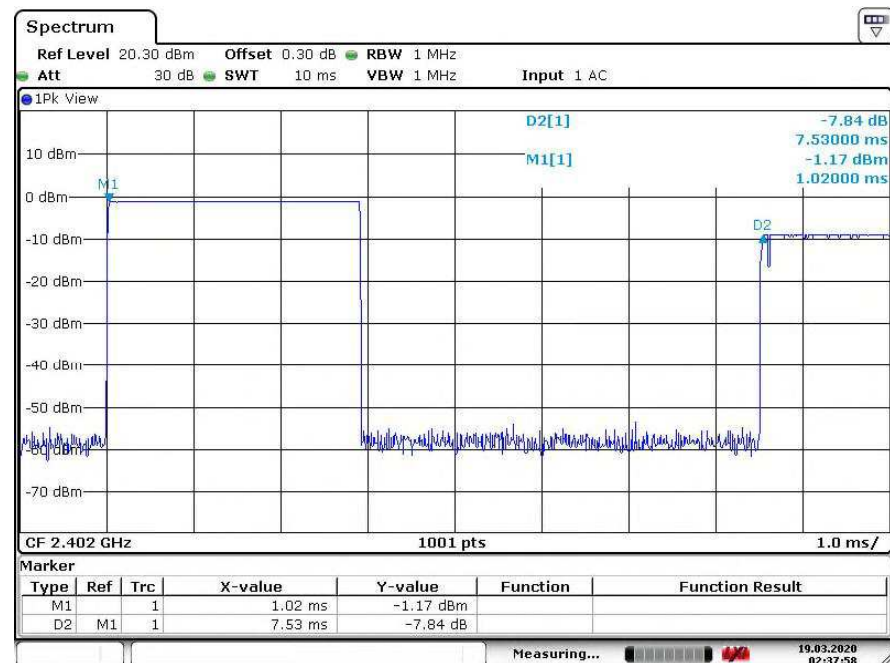
Dwell time = Pulse width x (Hopping rate / Number of channels) x Period

Period = 0.4 (seconds/ channel) x 79 (channel) = 31.6 seconds.

Hopping rate is 267 times per second

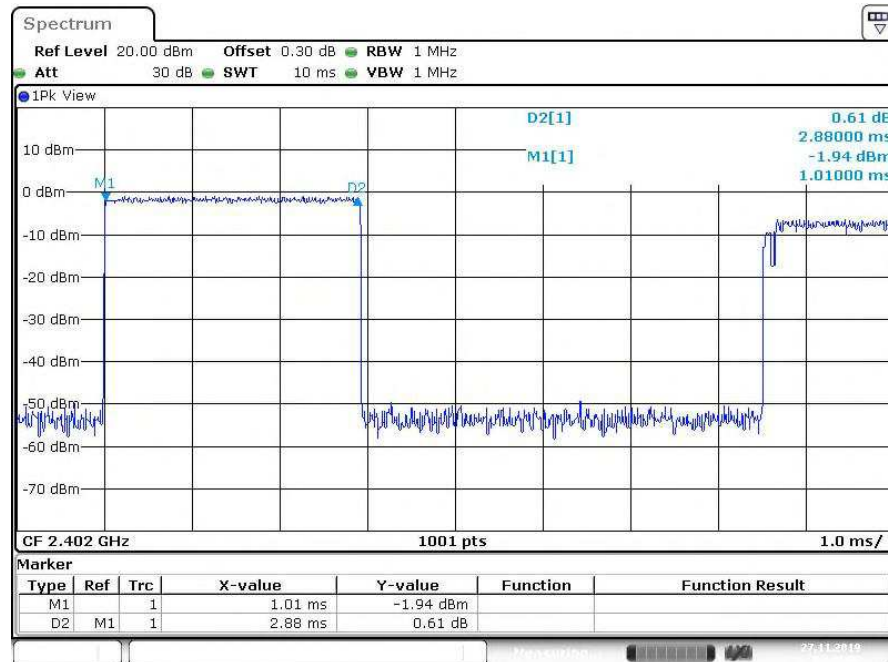
Test Plot of Time of Occupancy, DH5


Date: 27.NOV.2019 13:22:23

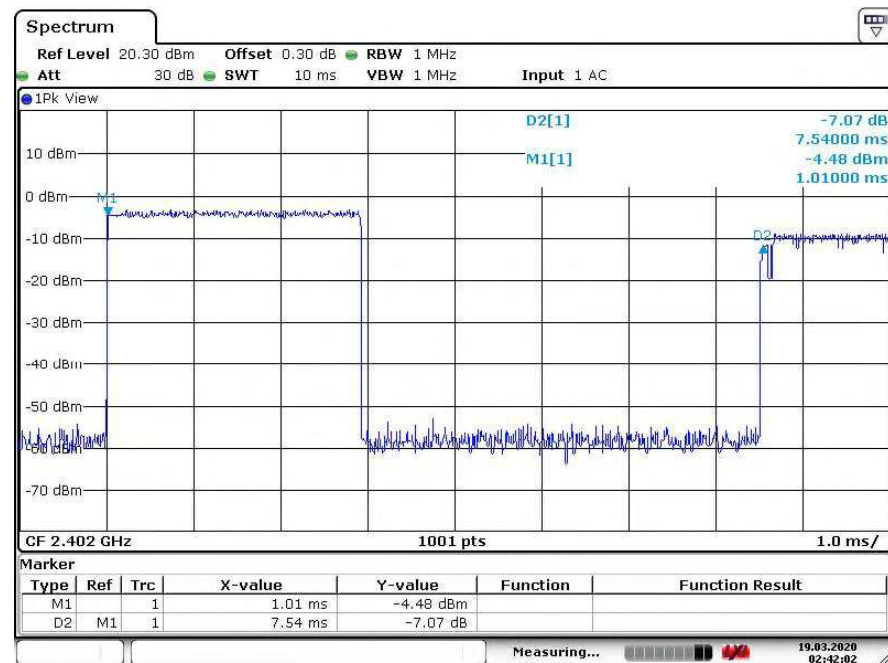


Date: 19.MAR.2020 02:37:58

Test Plot of Time of Occupancy, 3DH5



Date: 27.NOV.2019 13:20:42



Date: 19.MAR.2020 02:42:02

5.1.9 Mains Conducted Emissions

RESULT:**Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 ISED RSS-Gen 8.8
Limits	:	Mains Conducted emissions as defined in above standards
Kind of test site	:	Shielded Room

Test setup

Test Channel	:	High
Operation mode	:	A

Remark: For details refer to Appendix D.

6. Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

Test standard : FCC KDB Publication 447498 D01 v06
47CFR 1.1310
47CFR 2.1093
ISED RSS-102 issue 5

FCC:

Therefore the maximum output power of the transmitter is $2.98\text{mW} < 10\text{mW}$ (Distance: 5 mm), hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498 D01: Mobile Portable RF Exposure.

---End---

7. List of Tables

Table 1: Applied Standard and Test Levels	5
Table 2: List of Test and Measurement Equipment	7
Table 3: Emission Measurement Uncertainty.....	8
Table 4: Basic Information of EUT	9
Table 5: Technical Specification of EUT	9
Table 6: Frequency hopping information.....	10
Table 7: Table for Parameters of Test Software Setting	13
Table 8: Test result of Peak Output Power, DH5	17
Table 9: Test result of Peak Output Power, 2DH5	17
Table 10: Test result of Peak Output Power, 3DH5	18
Table 11: Test result of 20dB Bandwidth, DH5	19
Table 12: Test result of 20dB Bandwidth, 3DH5	19
Table 13: Test result of 99% Bandwidth, DH5	20
Table 14: Test result of 99% Bandwidth, 3DH5	20
Table 15: Test result of Frequency Separation, DH5.....	37
Table 16: Test result of Frequency Separation, 3DH5.....	37
Table 17: Test result of Number of hopping frequency, DH5.....	39
Table 18: Test result of Number of hopping frequency, 3DH5.....	39
Table 19: Test result of Time of Occupancy.....	42