FCC Radio Test Report

FCC ID: 2AY6XSF-0204

Report No.	:	BTL-FCCP-1-2012T108
Equipment	:	EGLTEC 4-Port UHF RFID Reader-Fixed
Model Name	:	SF-0204
Brand Name	:	EGLTEC
Applicant	:	EGLTEC Intelligent Technology Co., Ltd.
Address	:	No. 110, Ziyou Rd., Shanhua Dist, Tainan City, Taiwan (R.O.C.)
Radio Function	:	RFID UHF (920-928 MHz)
FCC Rule Part(s)	:	FCC Part15, Subpart C (15.247)
Measurement Procedure(s)	:	ANSI C63.10-2013
Date of Receipt	:	2020/12/17
Date of Test	:	2020/12/17 ~ 2021/3/29
Issued Date	:	2021/4/19

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by : Peter Chen, Engineer

Approved by : Scott Hsu , Manager

Testing Laboratory
0659

BTL Inc.
No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan
Tel: +886-2-2657-3299 Fax: +886-2-2657-3331 Web: www.newbtl.com

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REVISON HISTORY

Report No.	Version	Description	Issued Date
BTL-FCCP-1-2012T108	R00	Original Report.	2021/4/19

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

FCC Part 15, Subpart C (15.247)				
Standard(s) Section	**Description**	**Test Result**	**Judgement**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	------
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX B APPENDIX C	Pass	------
15.247 (a)(1)(i)	Number of Hopping Frequency	APPENDIX D	Pass	------
15.247 (a)(1)(iii)	Average Time of Occupancy	APPENDIX E	Pass	------
15.247 (a)(1)(i)	Hopping Channel Separation	APPENDIX F	Pass	------
15.247 (a)(1)(i)	Bandwidth	APPENDIX G	Pass	------
15.247 (b)(2)	Output Power	APPENDIX H	Pass	------
15.247(d)	Antenna conducted Spurious Emission	APPENDIX I	Pass	------
15.247 (a)(1)(i)	Dwell Time	APPENDIX I	Pass	------
15.203	Antenna Requirement	------	Pass	------

NOTE:
(1) ”N/A” denotes test is not applicable in this Test Report.
(2) The report format version is TP.1.1.1.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.

☒ C05 ☐ CB08 ☐ CB11 ☒ CB15 ☐ CB16
☒ SR05

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k = 2**, providing a level of confidence of approximately **95 %**. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions test :

Test Site	Measurement Frequency Range	U,(dB)
CB15	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C. Conducted test :

Test Item	U,(dB)
Number of Hopping Frequency	0.00
Average Time of Occupancy	1.20
Hopping Channel Separation	1.20
Bandwidth	1.13
Peak Output Power	1.06
Antenna conducted Spurious Emission	1.14
Dwell Time	1.20

NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	23 °C, 76 %	AC 120V	Tim Lee
Radiated emissions below 1 GHz	22 °C, 68 %	AC 120V	Jay Kao
Radiated emissions above 1 GHz	22 °C, 68 %	AC 120V	Jay Kao
Number of Hopping Frequency	22.4 °C, 50 %	AC 120V	Nero Hsieh
Average Time of Occupancy	22.4 °C, 50 %	AC 120V	Nero Hsieh
Hopping Channel Separation	22.4 °C, 50 %	AC 120V	Nero Hsieh
Bandwidth	22.4 °C, 50 %	AC 120V	Nero Hsieh
Output Power	22.4 °C, 50 %	AC 120V	Nero Hsieh
Antenna conducted Spurious Emission	22.4 °C, 50 %	AC 120V	Nero Hsieh
Dwell Time	22.4 °C, 50 %	AC 120V	Nero Hsieh

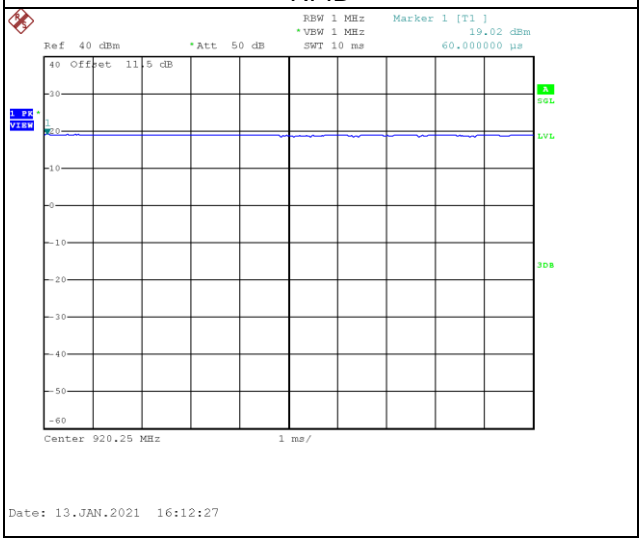
1.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

Test Software	UHF Demo V4.0.2.0R2		
Modulation Mode	920.25 MHz	927.25 MHz	Data Rate
-	19	18	-

1.5 DUTY CYCLE

If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.

RFID



Remark	Delta 1			Delta 2	On Time/Period	10 log(1/Duty Cycle)
Mode	ON (ms)	Numbers (ON)	On Time (B) (ms)	Period (ON+OFF) (ms)	Duty Cycle (%)	Duty Factor (dB)
RFID	1.000	1	1.000	1.000	100.00%	0

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	EGLTEC 4-Port UHF RFID Reader-Fixed
Model Name	SF-0204
Brand Name	EGLTEC
Model Difference	N/A
Power Source	DC voltage supplied from External Power Supply.
Power Rating	24V⎓2A
Products Covered	N/A
Operation Band	902 MHz ~ 928 MHz
Operation Frequency	920.25 MHz ~ 927.25 MHz
Modulation Technology	ASK
Output Power Max.	23.74 dBm (0.2366 W)
Test Model	SF-0204
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:

(1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

(2) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	920.25	08	924.25
01	920.75	09	924.75
02	921.25	10	925.25
03	921.75	11	925.75
04	922.25	12	926.25
05	922.75	13	926.75
06	923.25	14	927.25
07	923.75		

(3) Table for Filed Antenna:

Ant.	Brand	Model Name	Type	Connector	Gain (dBi)
0	Guangqi Technology Co., Ltd.	A1050C	PCB	SMA	3
1	Guangqi Technology Co., Ltd.	A1050C	PCB	SMA	3
2	Guangqi Technology Co., Ltd.	A1050C	PCB	SMA	3
3	Guangqi Technology Co., Ltd.	A1050C	PCB	SMA	3

Note: Equipment with 4 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used.
Antenna 0 is found to be the worst case and used for final test.
The antenna is the support unit for the test, which is not attached with the goods.

2.2 TEST MODES

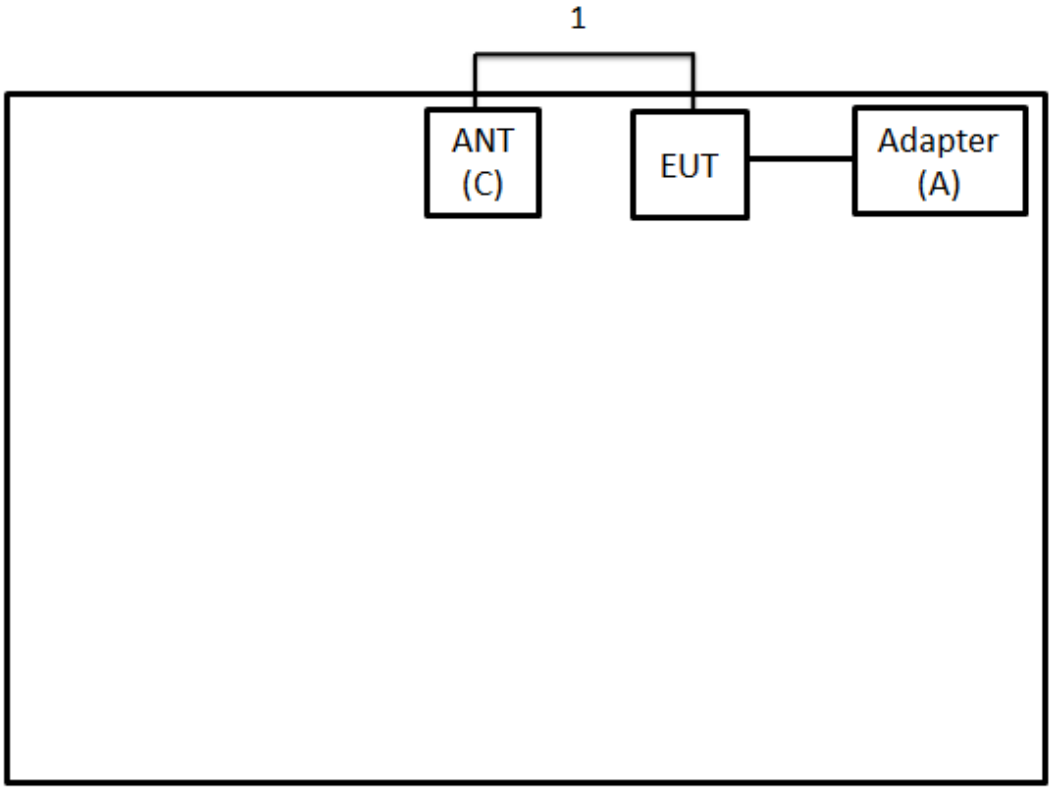
Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal/Idle	-	-
Transmitter Radiated Emissions (below 1GHz)	TX Mode	14	-
Transmitter Radiated Emissions (above 1GHz)	TX Mode	00/14	-
Number of Hopping Frequency	TX Mode	00~14	-
Average Time of Occupancy	TX Mode	00/14	-
Hopping Channel Separation	TX Mode	00/14	-
Bandwidth	TX Mode	00/14	-
Output Power	TX Mode	00/14	-
Antenna conducted Spurious Emission	TX Mode	00/14	-
Dwell Time	TX Mode	00/14	-

NOTE:
(1) The Radiated emissions test was verified based on the worst conducted power and Bandwidth test results reported in the original report.
(2) All X, Y and Z axes are evaluated, but only the worst case (X axis) is recorded.
(3) There were no emissions found below 30 MHz within 20 dB of the limit.

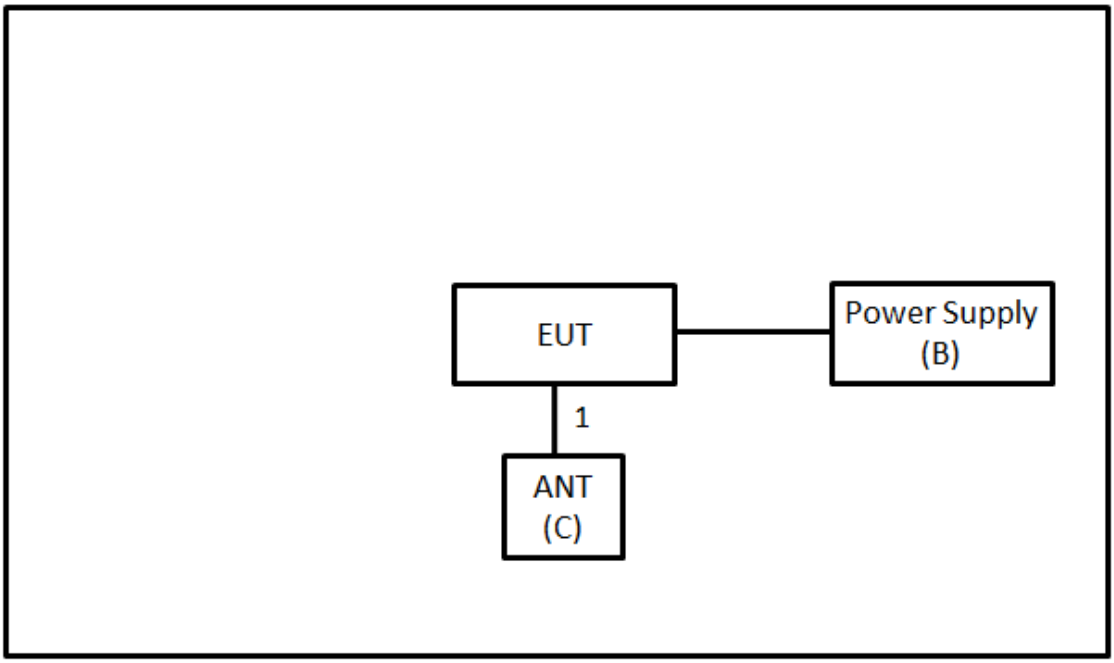
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.

AC power line conducted emissions



Radiated Emissions



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	Adapter	SUNNY	SYS1308-2412-W2C	N/A	Supplied by test requester
B	Power Supply	ABM	8303D	D021130	Furnished by test lab.
C	Antenna	Guangqi Technology Co., Ltd.	A1050C	N/A	Supplied by test requester

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	N/A	N/A	0.9m	Coaxial cable	Supplied by test requester

3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

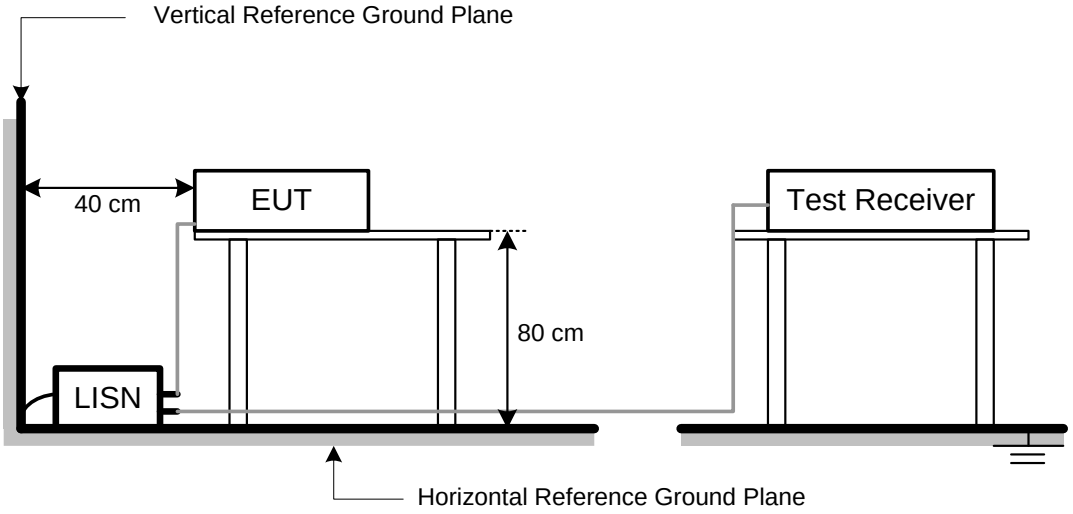
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
e. For the actual test configuration, please refer to the related Item - EUT TEST PHOTO.

NOTE:
(1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
BW=9 kHz (6 dB Bandwidth)
(2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.

4 RADIATED EMISSIONS TEST

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated Emissions (dBuV/m)		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

NOTE:
(1) The limit for radiated test was performed according to FCC Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
35.45	+	-11.37	=	24.08

Measurement Value		Limit Value		Margin Level
24.08	-	40	=	-15.92

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2 TEST PROCEDURE

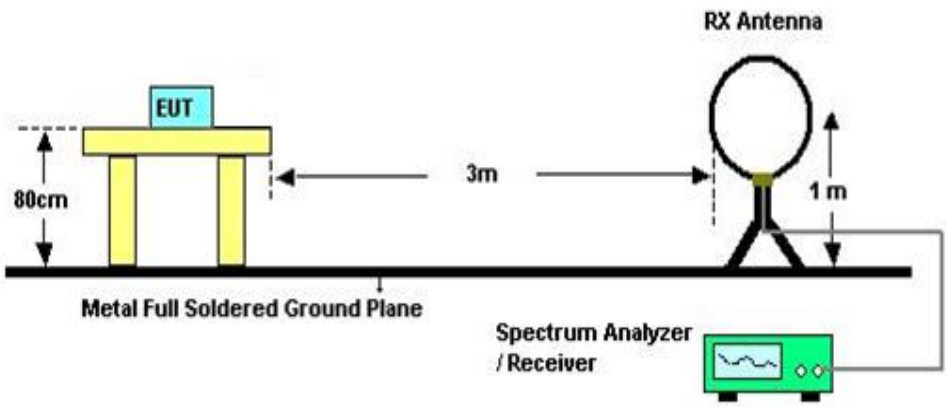
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1GHz)
i. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

4.3 DEVIATION FROM TEST STANDARD

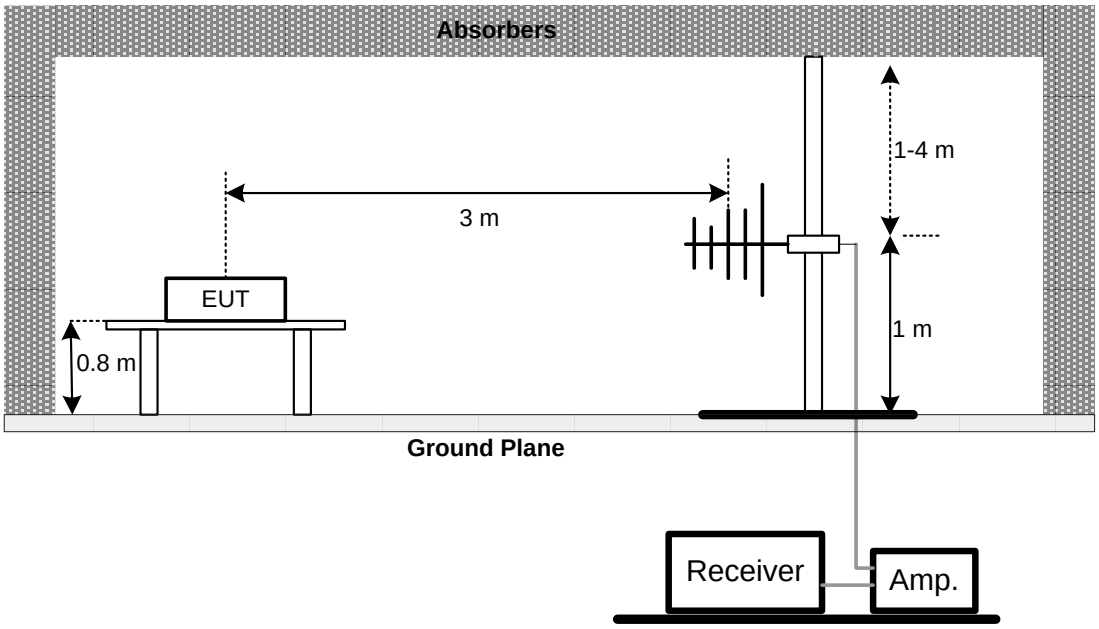
No deviation.

4.4 TEST SETUP

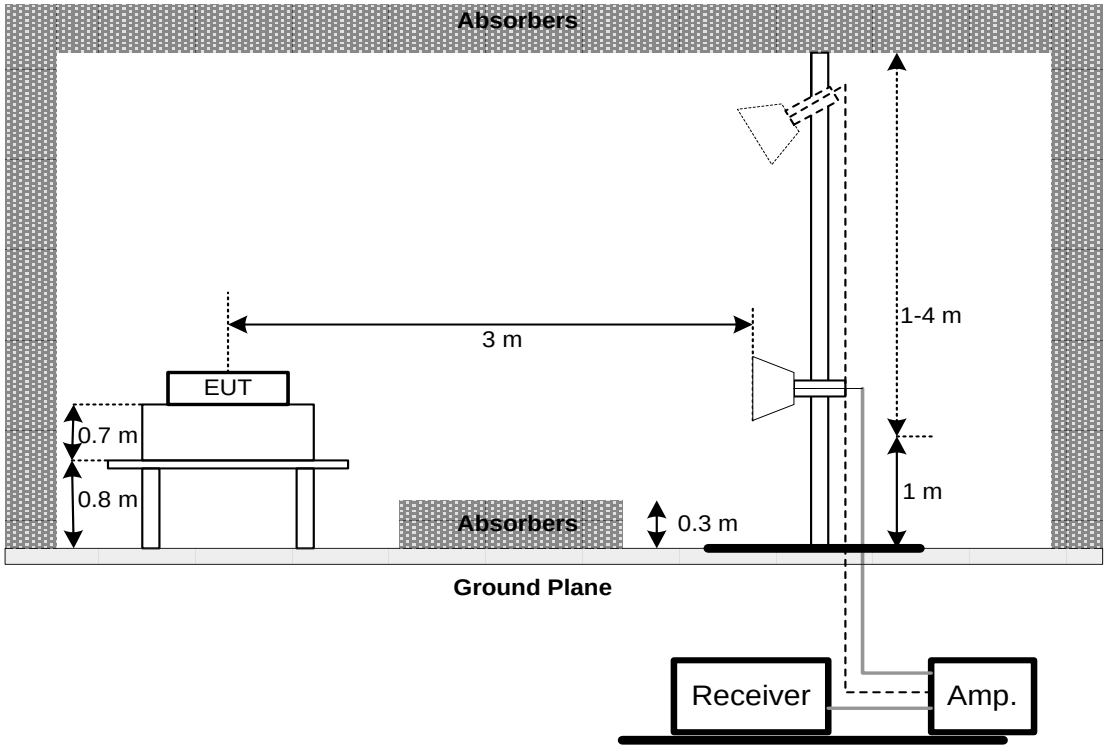
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.7 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5 NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(1)(i)	Number of Hopping Channel	902-928	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RBW	100 KHz
VBW	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW=100KHz, VBW=100KHz, Sweep time = Auto.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP

5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Please refer to the APPENDIX D.

6 AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)(i)	Average Time of Occupancy	0.4sec	902-928	PASS

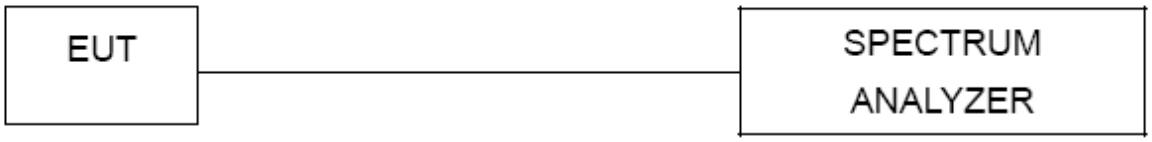
6.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. AFH: Packet permit maximum 416/16/15 = 1.733 hops per second in each channel(12 time slots Tx, 4 time slots Stop). So, the dwell time is the time duration of the pulse times 1.733 x 6 = 10.4 within 6 seconds.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

Please refer to the APPENDIX E.

7 HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 KHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RBW	30 KHz
VBW	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

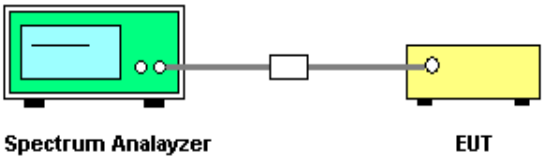
a. The EUT must have its hopping function enabled

b. Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = Auto
Detector function = Peak
Trace = Max Hold

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 TEST RESULTS

Please refer to the APPENDIX F.

8 BANDWIDTH TEST

8.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Frequency Range (MHz)
15.247(a)(1)(i)	Bandwidth	902-928

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RBW	30 KHz (20dB Bandwidth) / 30 KHz (Channel Separation)
VBW	100 KHz (20dB Bandwidth) / 100 KHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep Time = Auto.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

Please refer to the APPENDIX G.

9 OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(2)	Peak Output Power	1 Watt or 30dBm (hopping channel >75) 0.125 Watt or 21dBm (hopping channel <75	902-928	PASS

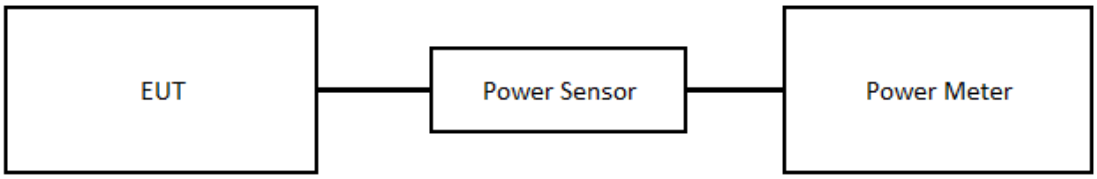
9.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 unless otherwise a special operating condition is specified in the follows during the testing.

9.6 TEST RESULTS

Please refer to the APPENDIX H.

10 ANTENNA CONDUCTED SPURIOUS EMISSION

10.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

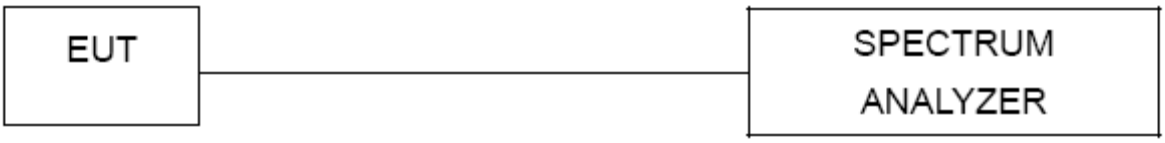
10.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.
c. Offset=antenna gain+cable loss

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 unless otherwise a special operating condition is specified in the follows during the testing.

10.6 TEST RESULTS

Please refer to the APPENDIX I.

11 LIST OF MEASURING EQUIPMENTS

AC Power Line Conducted Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	2020/6/11	2021/6/10
2	Test Cable	EMCI	EMC400-BM-BM-5000	170501	2020/6/8	2021/6/7
3	EMI Test Receiver	R&S	ESCI	100080	2020/6/15	2021/6/14
4	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC02325B	980217	2020/4/10	2021/4/9
2	Preamplifier	EMCI	EMC012645B	980267	2020/4/10	2021/4/9
3	Test Cable	EMCI	EMC-SM-SM-1000	180809	2020/4/10	2021/4/9
4	Test Cable	EMCI	EMC104-SM-SM-3000	151205	2020/4/10	2021/4/9
5	Test Cable	EMCI	EMC-SM-SM-7000	180408	2020/4/10	2021/4/9
6	MXE EMI Receiver	Agilent	N9038A	MY554200087	2020/6/10	2021/6/9
7	Signal Analyzer	Agilent	N9010A	MY56480554	2020/8/25	2021/8/24
8	Horn Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	2020/6/12	2021/6/11
9	Horn Ant	Schwarzbeck	BBHA 9170	BBHA 9170340	2020/7/9	2021/7/8
10	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	VULB 9168-352	2020/7/24	2021/7/23
11	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0625	2020/7/24	2021/7/23
12	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

Number of Hopping Frequency						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2020/6/15	2021/6/14

Average Time of Occupancy						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2020/6/15	2021/6/14

Hopping Channel Separation						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2020/6/15	2021/6/14

Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2020/6/15	2021/6/14

Output Power						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Power Meter	Anritsu	ML2495A	1128008	2020/6/11	2021/6/10
2	Power Sensor	Anritsu	MA2411B	1126001	2020/6/11	2021/6/10

Antenna conducted Spurious Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2020/6/15	2021/6/14

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

12 EUT TEST PHOTO

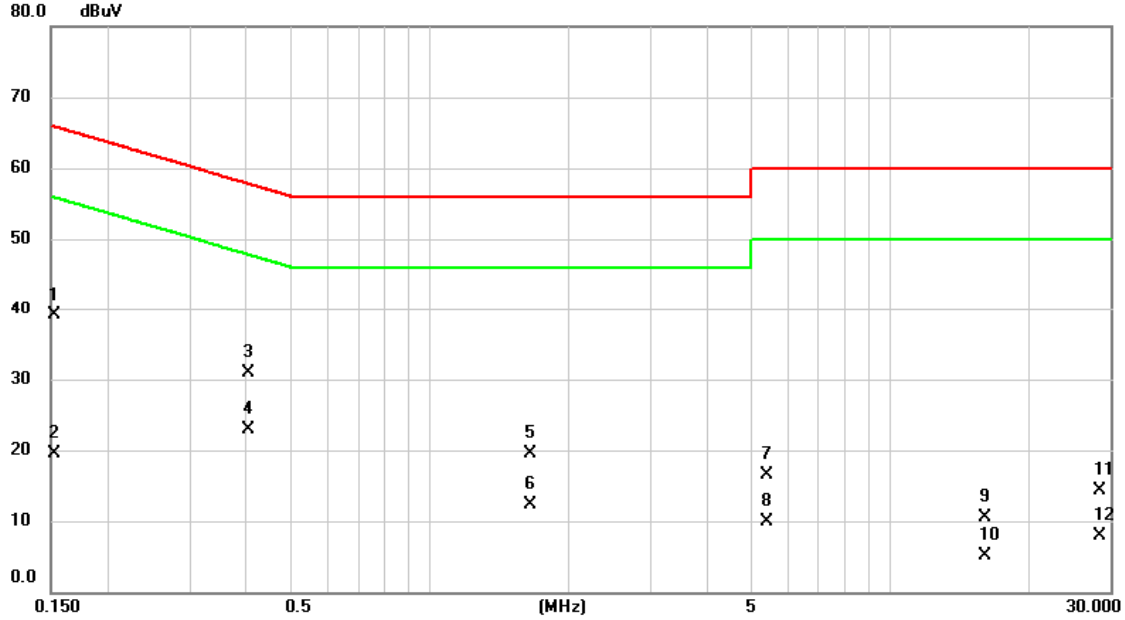
Please refer to document Appendix No.: TP-2012T108-FCCP-1 (APPENDIX-TEST PHOTOS).

13 EUT PHOTOS

Please refer to document Appendix No.: EP-2012T108-1 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

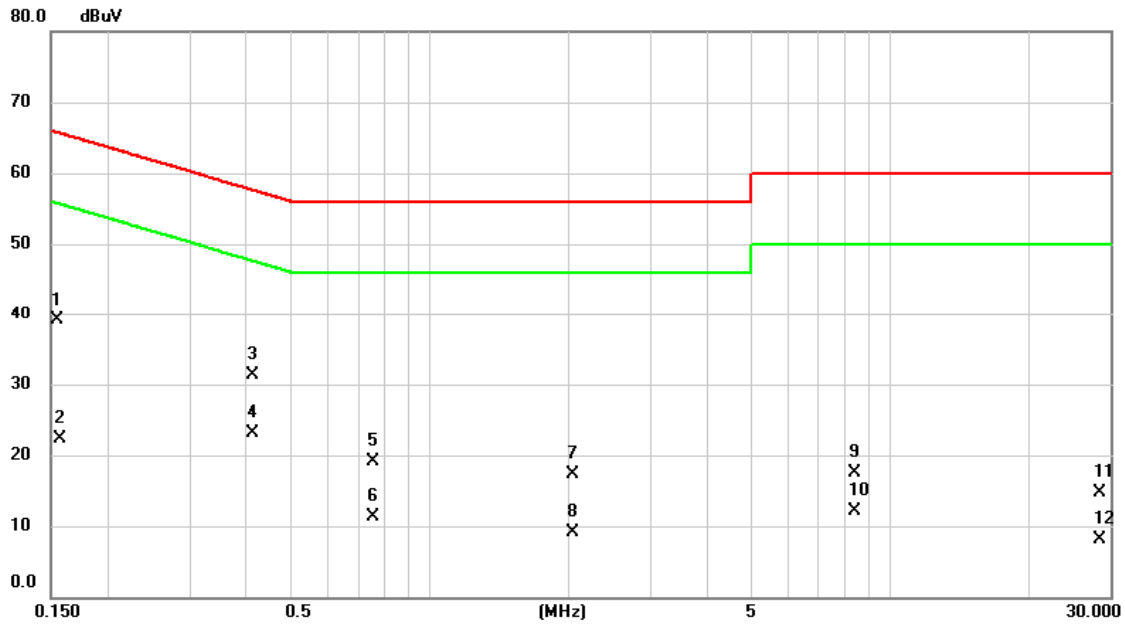
Test Mode	Normal	Tested Date	2021/1/22
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1522	39.12	0.01	39.13	65.88	-26.75	QP	
2		0.1522	19.53	0.01	19.54	55.88	-36.34	AVG	
3		0.4042	30.78	0.03	30.81	57.77	-26.96	QP	
4	*	0.4042	22.92	0.03	22.95	47.77	-24.82	AVG	
5		1.6463	19.44	0.07	19.51	56.00	-36.49	QP	
6		1.6463	12.18	0.07	12.25	46.00	-33.75	AVG	
7		5.4240	16.41	0.15	16.56	60.00	-43.44	QP	
8		5.4240	9.70	0.15	9.85	50.00	-40.15	AVG	
9		16.0688	10.27	0.22	10.49	60.00	-49.51	QP	
10		16.0688	4.90	0.22	5.12	50.00	-44.88	AVG	
11		28.4438	14.01	0.24	14.25	60.00	-45.75	QP	
12		28.4438	7.72	0.24	7.96	50.00	-42.04	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

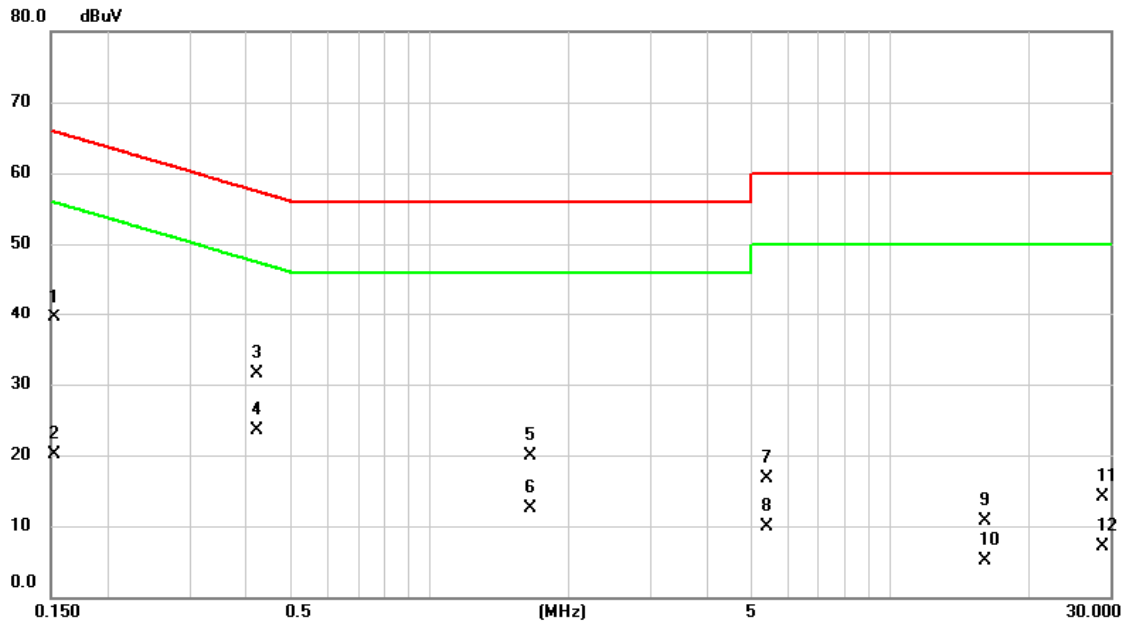
Test Mode	Normal	Tested Date	2021/1/22
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1545	39.06	0.01	39.07	65.75	-26.68	QP	
2		0.1568	22.32	0.01	22.33	55.63	-33.30	AVG	
3		0.4132	31.23	0.03	31.26	57.58	-26.32	QP	
4	*	0.4132	23.10	0.03	23.13	47.58	-24.45	AVG	
5		0.7552	19.04	0.04	19.08	56.00	-36.92	QP	
6		0.7552	11.36	0.04	11.40	46.00	-34.60	AVG	
7		2.0423	17.19	0.08	17.27	56.00	-38.73	QP	
8		2.0423	9.12	0.08	9.20	46.00	-36.80	AVG	
9		8.3805	17.25	0.19	17.44	60.00	-42.56	QP	
10		8.3805	11.90	0.19	12.09	50.00	-37.91	AVG	
11		28.4460	14.41	0.24	14.65	60.00	-45.35	QP	
12		28.4460	7.89	0.24	8.13	50.00	-41.87	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

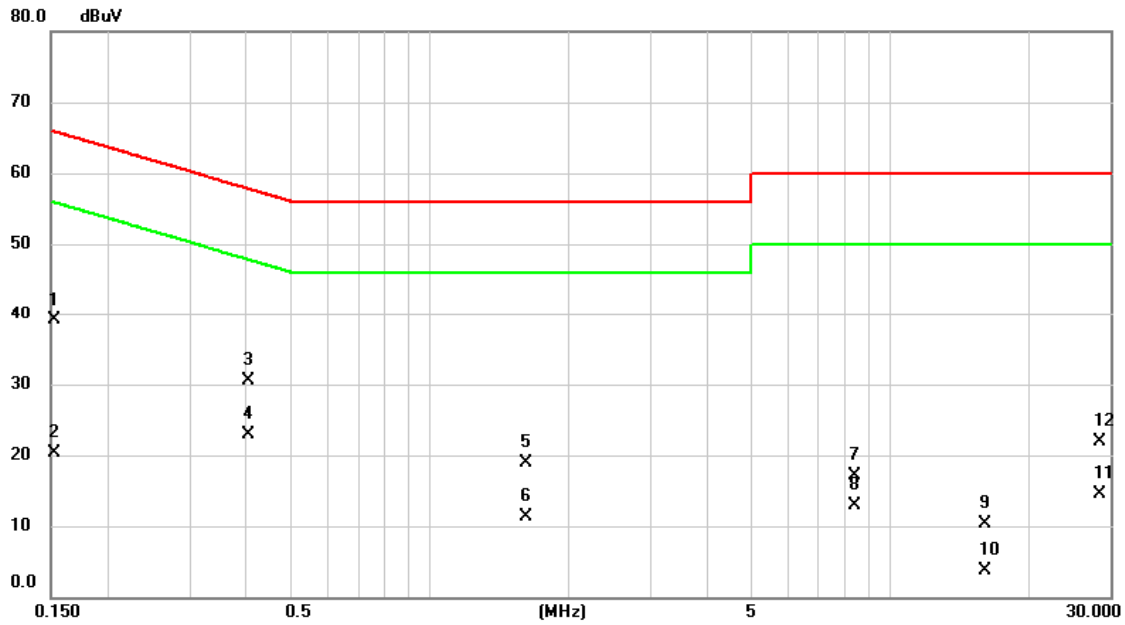
Test Mode	Idle	Tested Date	2021/1/22
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1522	39.41	0.01	39.42	65.88	-26.46	QP	
2		0.1522	20.04	0.01	20.05	55.88	-35.83	AVG	
3		0.4222	31.51	0.03	31.54	57.40	-25.86	QP	
4	*	0.4222	23.46	0.03	23.49	47.40	-23.91	AVG	
5		1.6463	19.83	0.07	19.90	56.00	-36.10	QP	
6		1.6463	12.35	0.07	12.42	46.00	-33.58	AVG	
7		5.4263	16.48	0.15	16.63	60.00	-43.37	QP	
8		5.4263	9.74	0.15	9.89	50.00	-40.11	AVG	
9		16.0395	10.49	0.22	10.71	60.00	-49.29	QP	
10		16.0395	4.79	0.22	5.01	50.00	-44.99	AVG	
11		28.9298	13.90	0.24	14.14	60.00	-45.86	QP	
12		28.9298	6.86	0.24	7.10	50.00	-42.90	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Idle	Tested Date	2021/1/22
Test Frequency	-	Phase	Neutral

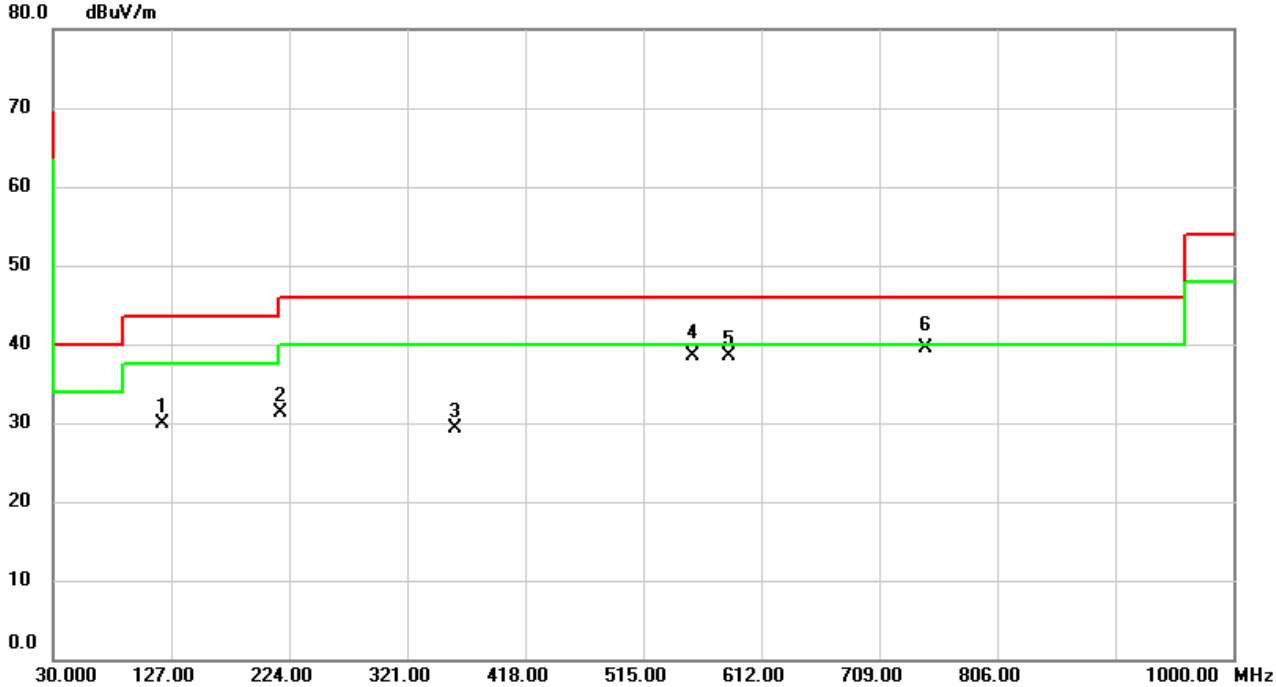


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1522	39.08	0.01	39.09	65.88	-26.79	QP	
2		0.1522	20.31	0.01	20.32	55.88	-35.56	AVG	
3		0.4042	30.57	0.03	30.60	57.77	-27.17	QP	
4	*	0.4042	22.96	0.03	22.99	47.77	-24.78	AVG	
5		1.6193	18.79	0.06	18.85	56.00	-37.15	QP	
6		1.6193	11.29	0.06	11.35	46.00	-34.65	AVG	
7		8.3648	17.00	0.19	17.19	60.00	-42.81	QP	
8		8.3648	12.65	0.19	12.84	50.00	-37.16	AVG	
9		16.1048	10.11	0.22	10.33	60.00	-49.67	QP	
10		16.1048	3.57	0.22	3.79	50.00	-46.21	AVG	
11		28.4370	14.32	0.24	14.56	60.00	-45.44	QP	
12		28.4370	21.70	0.24	21.94	50.00	-28.06	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

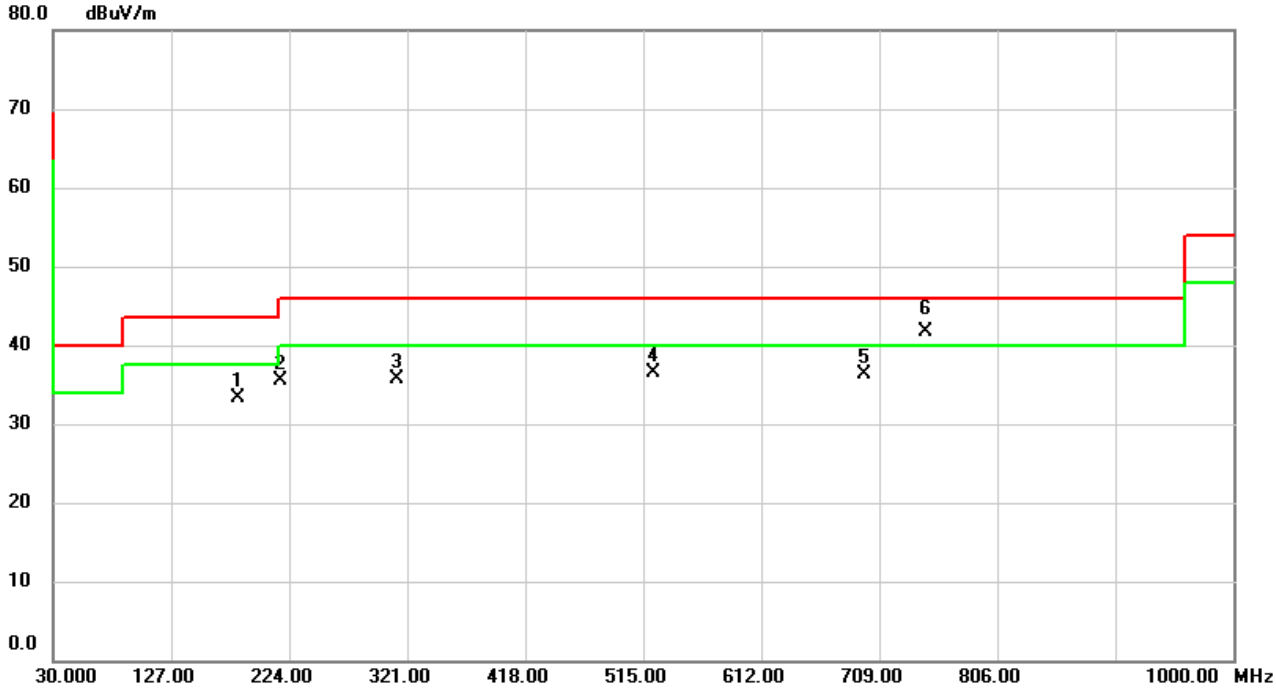
Test Mode	TX	Test Date	2021/1/4
Test Frequency	927.25MHz	Polarization	Vertical
Temp	22°C	Hum.	68%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		120.2100	40.36	-10.44	29.92	43.50	-13.58	peak	
2		216.2400	42.14	-10.81	31.33	46.00	-14.67	peak	
3		359.8000	35.26	-5.88	29.38	46.00	-16.62	peak	
4		555.7400	40.25	-1.66	38.59	46.00	-7.41	QP	
5		584.8400	39.55	-0.97	38.58	46.00	-7.42	peak	
6	*	746.8300	37.66	1.86	39.52	46.00	-6.48	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX	Test Date	2021/1/4
Test Frequency	927.25MHz	Polarization	Horizontal
Temp	22°C	Hum.	68%

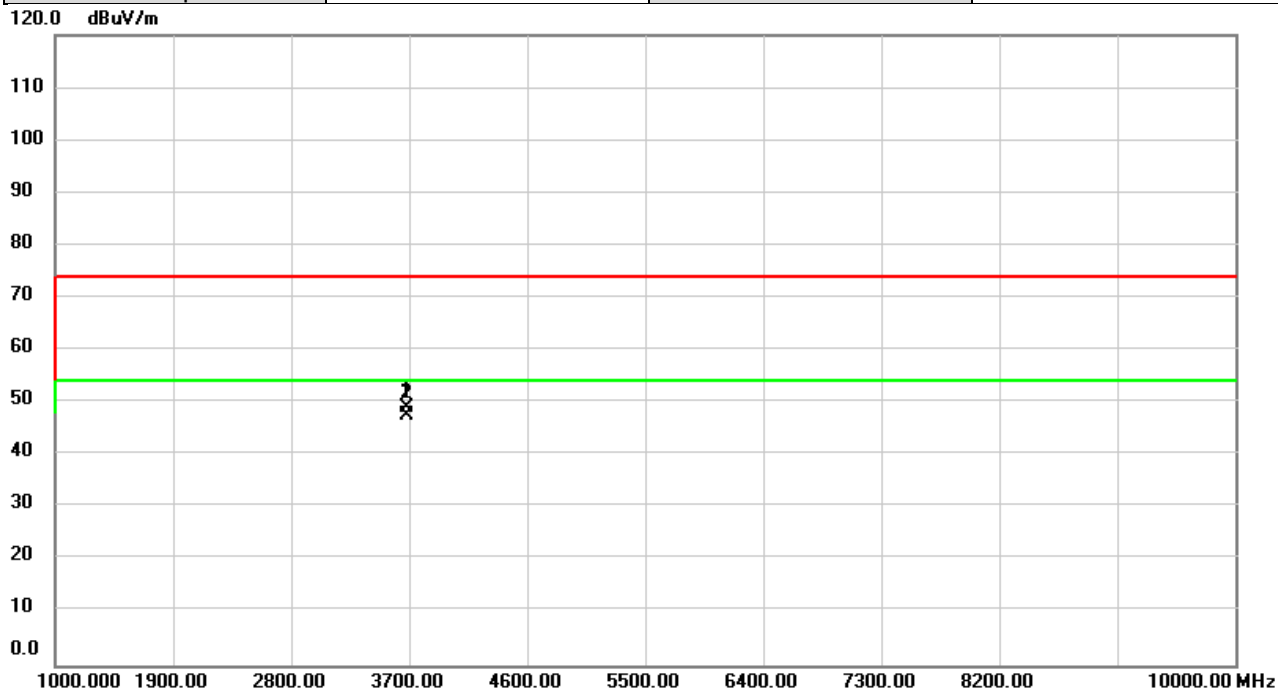


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		181.3200	43.10	-9.86	33.24	43.50	-10.26	peak	
2		216.2400	46.28	-10.81	35.47	46.00	-10.53	peak	
3		312.2700	42.84	-7.07	35.77	46.00	-10.23	peak	
4		522.7600	38.89	-2.32	36.57	46.00	-9.43	peak	
5		696.3900	35.53	0.75	36.28	46.00	-9.72	peak	
6	*	746.8300	39.82	1.86	41.68	46.00	-4.32	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ

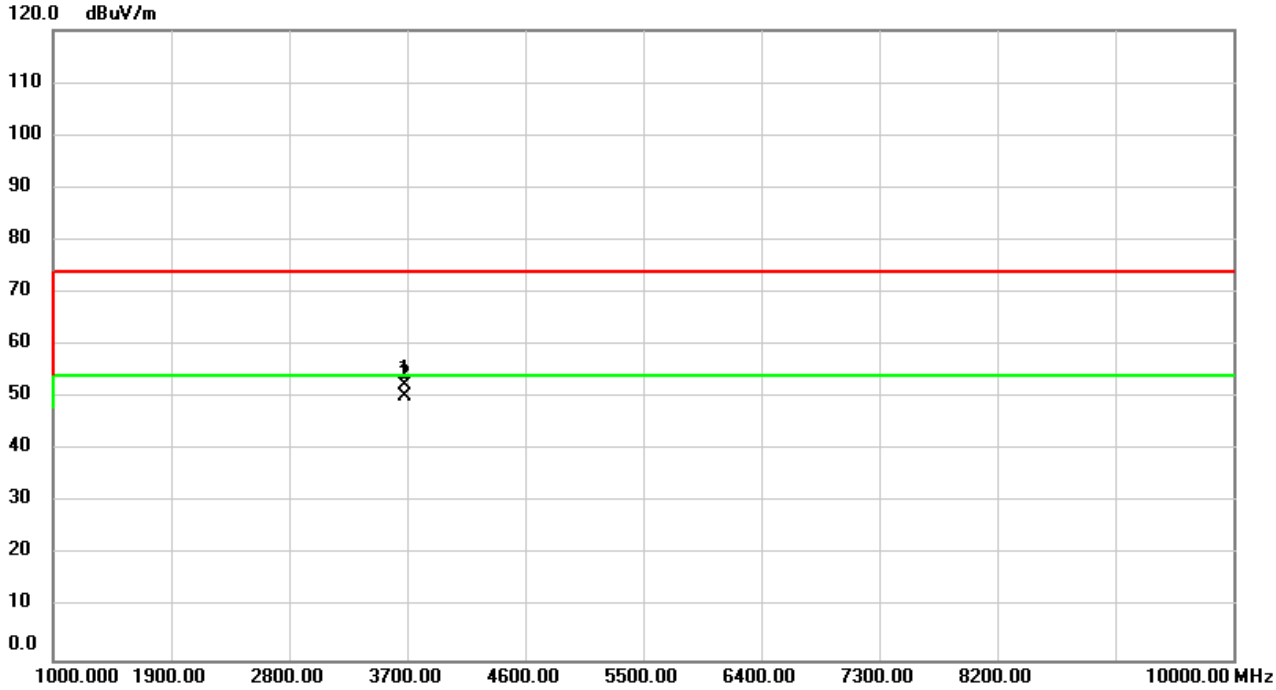
Test Mode	TX	Test Date	2021/1/4
Test Frequency	920.25MHz	Polarization	Vertical
Temp	22°C	Hum.	68%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		3681.100	61.24	-12.13	49.11	74.00	-24.89	peak	
2	*	3681.100	59.63	-12.13	47.50	54.00	-6.50	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

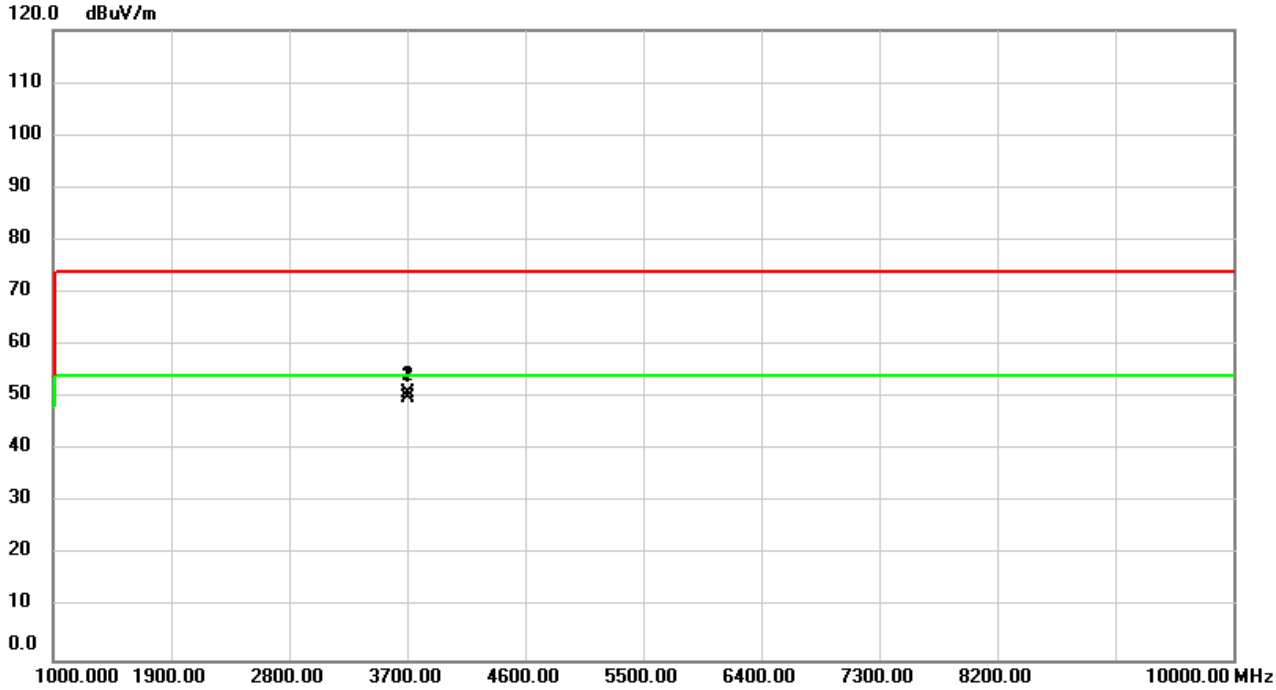
Test Mode	TX	Test Date	2021/1/4
Test Frequency	920.25MHz	Polarization	Horizontal
Temp	22°C	Hum.	68%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		3681.100	64.62	-12.13	52.49	74.00	-21.51	peak	
2	*	3681.100	62.33	-12.13	50.20	54.00	-3.80	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

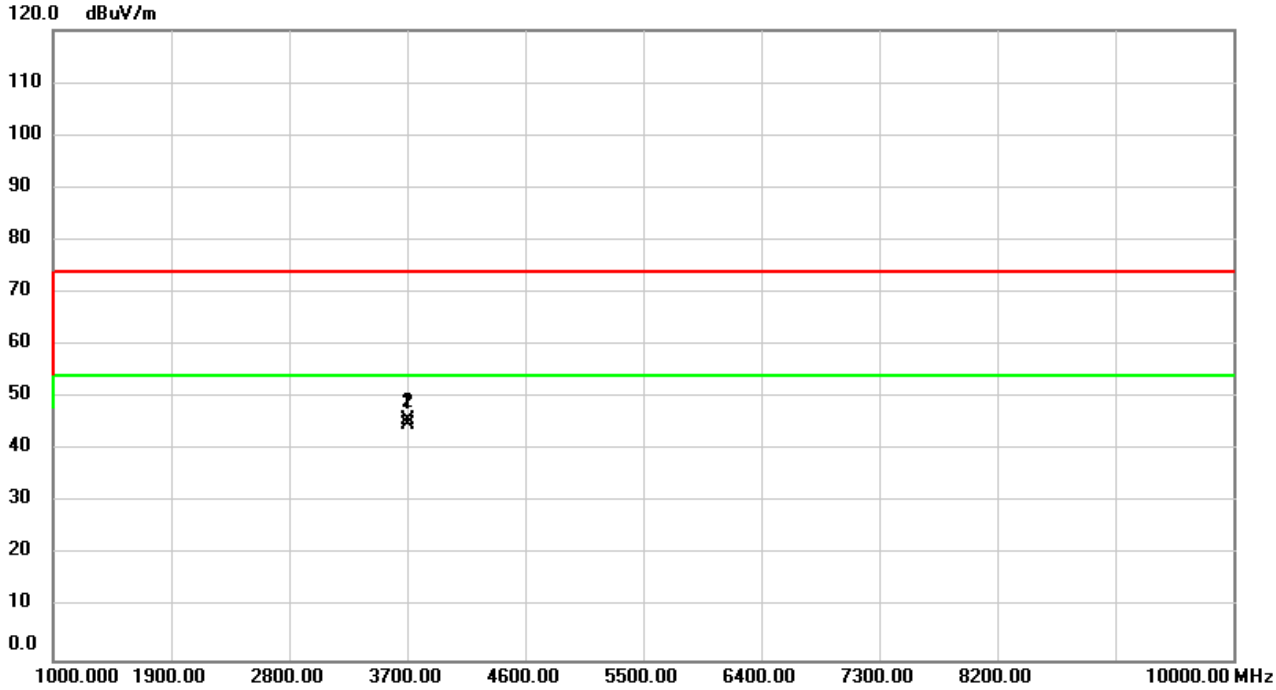
Test Mode	TX	Test Date	2021/1/4
Test Frequency	927.25MHz	Polarization	Horizontal
Temp	22°C	Hum.	68%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		3708.700	62.89	-12.08	50.81	74.00	-23.19	peak	
2	*	3708.700	62.09	-12.08	50.01	54.00	-3.99	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX	Test Date	2021/1/4
Test Frequency	927.25MHz	Polarization	Vertical
Temp	22°C	Hum.	68%



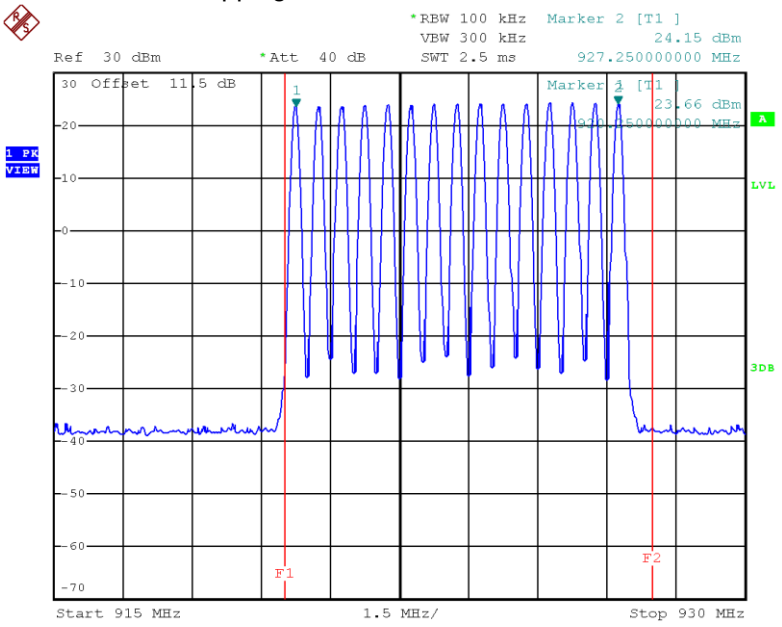
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		3709.000	57.81	-12.08	45.73	74.00	-28.27	peak	
2	*	3709.000	56.81	-12.08	44.73	54.00	-9.27	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D NUMBER OF HOPPING CHANNEL

Test Mode	TX

Number of Hopping Channel 15



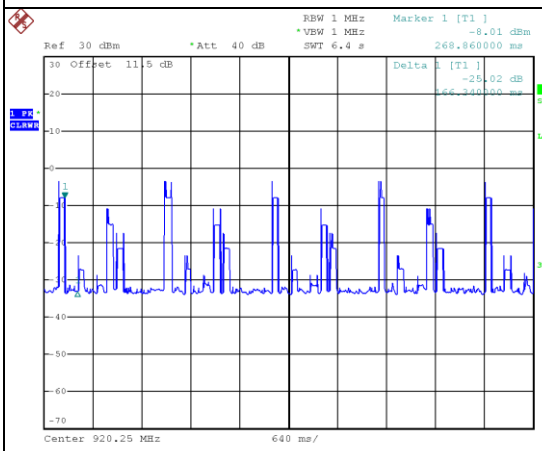
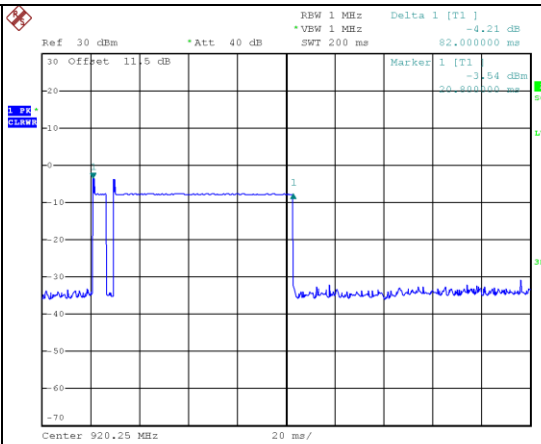
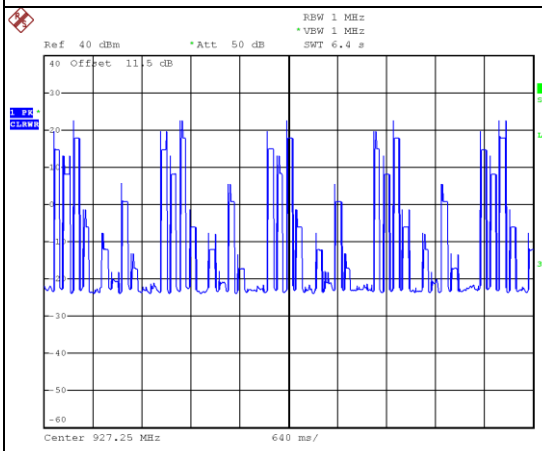
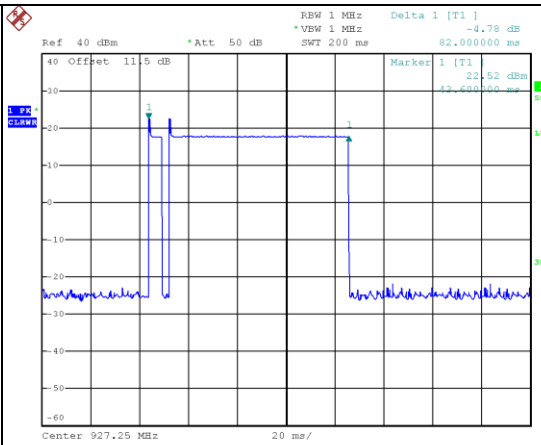
Date: 15.JAN.2021 11:33:07

APPENDIX E AVERAGE TIME OF OCCUPANCY

Test Mode :	TX

Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
-	920.25	82.0000	0.2460	0.4000	Pass
-	927.25	82.0000	0.2460	0.4000	Pass

Dwell Time = Pulse Time(s)* Channel hopping rate* Occupancy Time Limit
Occupancy Time Limit = 0.4* Channel

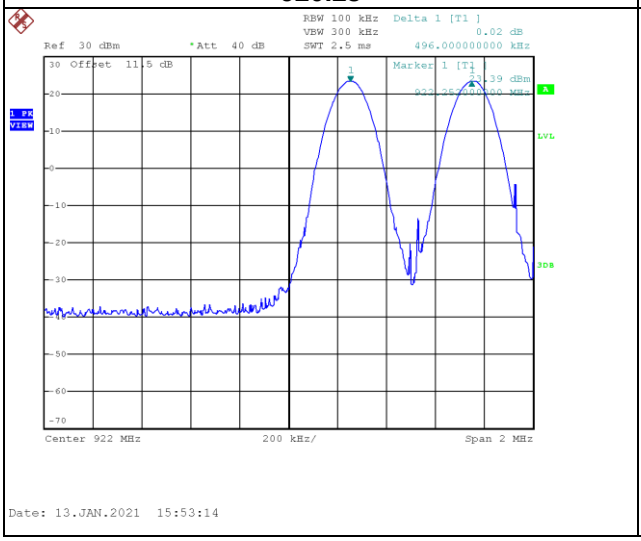
Dwell Time	Dwell Time 1Pulse No of Slot
920.25	
	
927.25	
	

APPENDIX F HOPPING CHANNEL SEPARATION MEASUREMENT

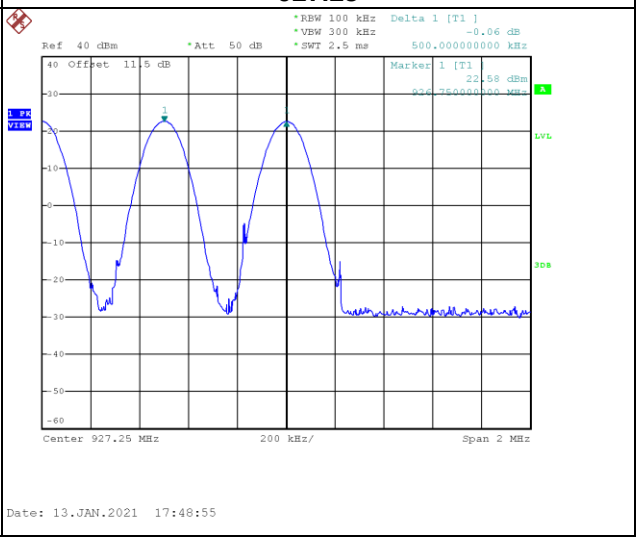
Test Mode :	Hopping on _TX

Frequency (MHz)	Channel Separation (MHz)	20dB Bandwidth (MHz)	Test Result
920.25	496.000	62.000	Pass
927.25	500.000	60.000	Pass

920.25



927.25

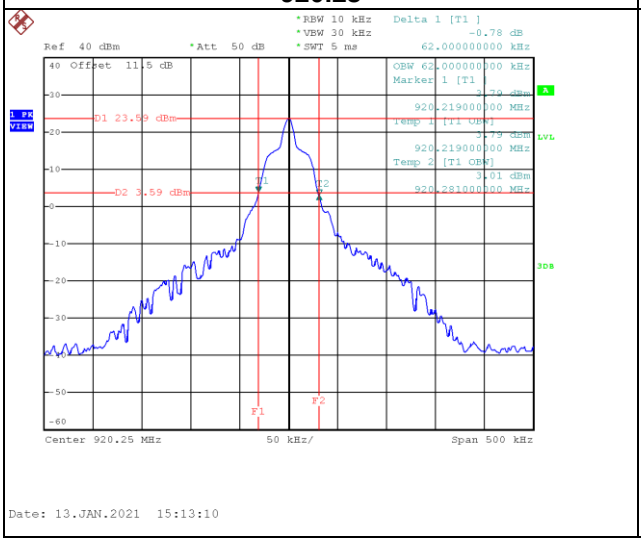


APPENDIX G BANDWIDTH

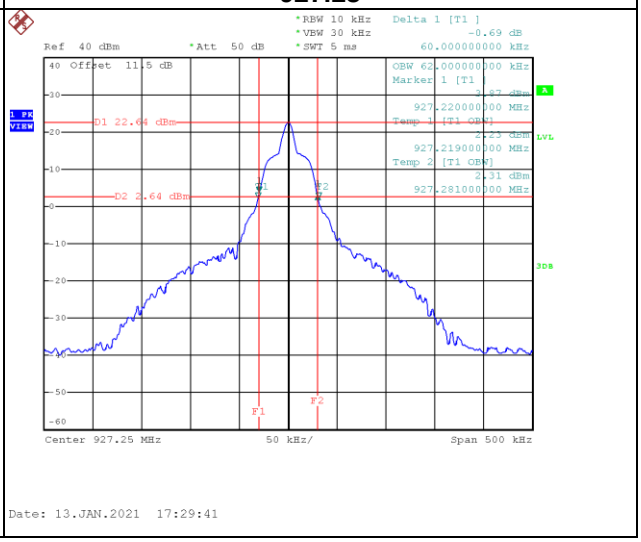
Test Mode :	TX

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
920.25	62.000	62.000	Pass
927.25	60.000	62.000	Pass

920.25



927.25



APPENDIX H OUTPUT POWER

Test Mode :	TX _ Ant 0	Tested Date	2021/1/13

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
920.25	23.74	0.2366	30.00	1.0000	Pass
927.25	23.24	0.2109	30.00	1.0000	Pass

Test Mode :	TX _ Ant 1	Tested Date	2021/1/13

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
920.25	23.54	0.2259	30.00	1.0000	Pass
927.25	23.22	0.2099	30.00	1.0000	Pass

Test Mode :	TX _ Ant 2	Tested Date	2021/1/13

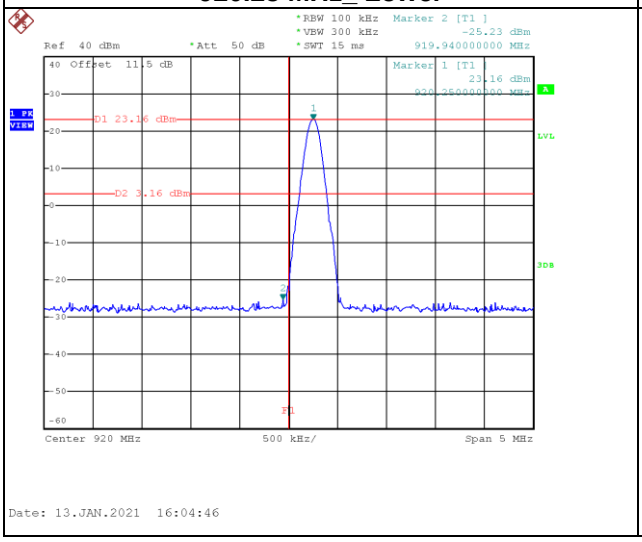
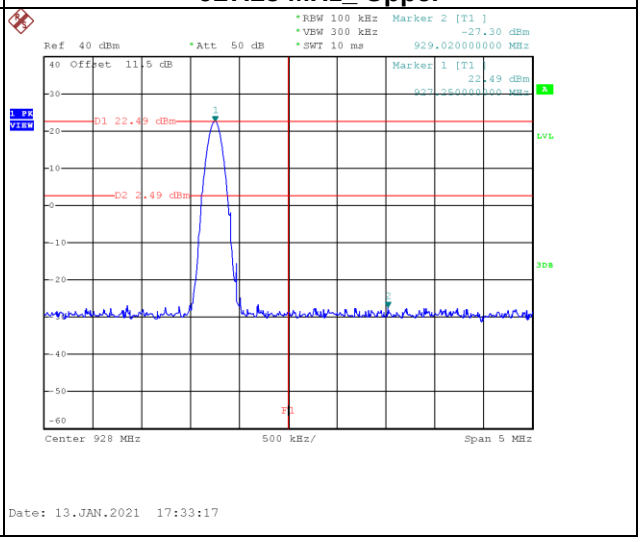
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
920.25	23.65	0.2317	30.00	1.0000	Pass
927.25	23.14	0.2061	30.00	1.0000	Pass

Test Mode :	TX _ Ant 3	Tested Date	2021/1/13

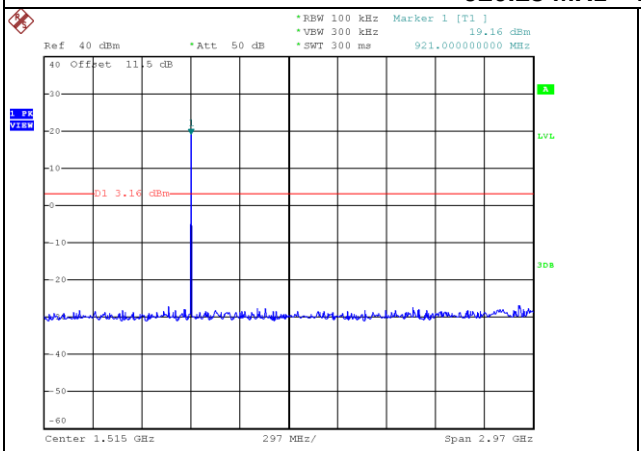
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
920.25	23.64	0.2312	30.00	1.0000	Pass
927.25	23.11	0.2046	30.00	1.0000	Pass

APPENDIX I ANTENNA CONDUCTED SPURIOUS EMISSION

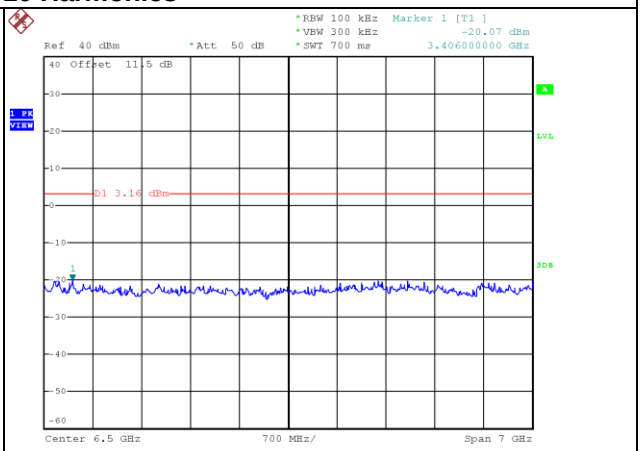
Test Mode	TX

920.25 MHz_ Lower	927.25 MHz_ Upper
	

920.25 MHz – 10 Harmonics

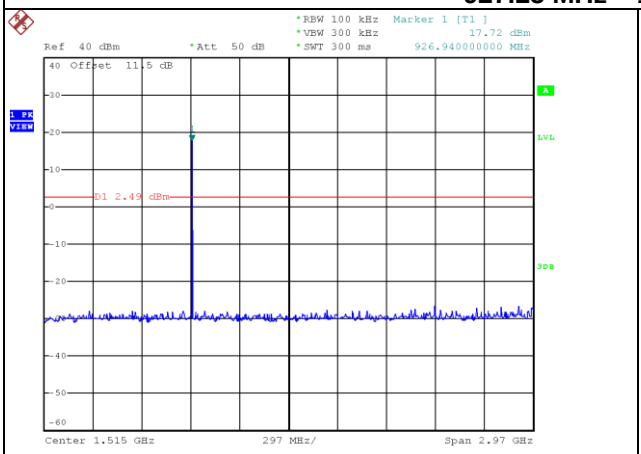


Date: 13.JAN.2021 16:08:11



Date: 13.JAN.2021 16:09:47

927.25 MHz – 10 Harmonics



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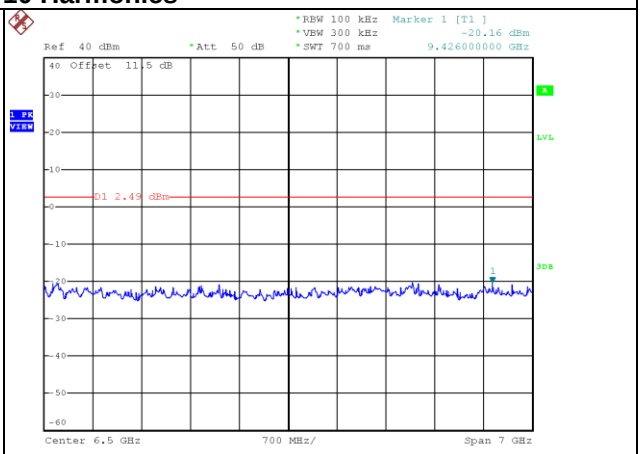

Date: 13.JAN.2021 17:36:19

End of Test Report