

FCC Radio Test Report


FCC ID: M82-AIM-EXT0-0049

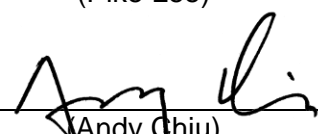
This report concerns (check one): ☒ Original Grant ☐ Class I Change ☐ Class II Change

Project No. : 1809T052
Equipment : AIM UHF Extension
Test Model : AIM-EXT0-0049
Series Model : AIM-EXT0-xxxx (Where "x" may be any alphanumeric character, "-" or blank)
Applicant : Advantech Co., Ltd.
Address : No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491, Taiwan, R.O.C.

Date of Receipt : 2018/9/19
Date of Test : 2018/9/19 ~ 2019/5/24
Issued Date : 2019/10/8
Tested by : BTL Inc.

Testing Engineer : 
(Tim Lee)

Technical Manager : 
(Pike Lee)

Authorized Signatory : 
(Andy Chiu)

B T L I N C .

No.18, Ln. 171, Sec. 2, Jiuzong Rd.,
Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
TEL:+886-2-2657-3299 FAX: +886-2- 2657-3331



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The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

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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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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	2019/9/12
R01	Revised Series Model.	2019/9/16
R02	Revised report to address TCB's comments.	2019/9/25
R03	Revised report to address TCB's comments.	2019/10/8

1. CERTIFICATION

Equipment : AIM UHF Extension
Brand Name : ADVANTECH
Test Model : AIM-EXT0-0049
Series Model : AIM-EXT0-xxxx (Where “x” may be any alphanumeric character, “-” or blank)
Applicant : Advantech Co., Ltd.
Manufacturer : Advantech Co., Ltd.
Address : No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491, Taiwan, R.O.C.
Date of Test : 2018/9/19 ~ 2019/5/24
Test Sample : Engineering Sample
Standard(s) : FCC Part15, Subpart C (15.247)/ ANSI C63.10-2013

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

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1809T052) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15, Subpart C (15.247)			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)(i)	Hopping Channel Separation	PASS	
15.247 (a)(1)(i)	Bandwidth	PASS	
15.247 (b)(2)	Peak Output Power	PASS	
15.247(d) 15.209	Radiated Spurious Emission	PASS	
15.247 (a)(1)(i)	Number of Hopping Frequency	PASS	
15.247 (a)(1)(i)	Dwell Time	PASS	
15.205	Restricted Bands	PASS	
15.203	Antenna Requirement	PASS	

Note:

(1) "N/A" denotes test is not applicable in this test report

2.1 TEST FACILITY

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

Conducted emission Test:

C05: (VCCI RN: C-14742; FCC RN:674415; FCC DN:TW0659)

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

Radiated emission Test (Below 1 GHz):

CB15: (VCCI RN: R-20020; FCC RN:674415; FCC DN:TW0659; ISED Assigned Code:20088-5)

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

Radiated emission Test (Above 1 GHz):

CB15: (VCCI RN: G-20031; FCC RN:674415; FCC DN:TW0659; ISED Assigned Code:20088-5)

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

The reported uncertainty of measurement $y \pm U$, 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 %.

A. Conducted emission test:

Test Site	Method	Measurement Frequency Range	U , (dB)
C05	CISPR	150 kHz ~ 30MHz	2.68

B. Radiated emission test:

Test Site	Method	Measurement Frequency Range	U , (dB)
CB15 (3m)	CISPR	9kHz ~ 150kHz	2.82
		150kHz ~ 30MHz	2.58

Test Site	Method	Measurement Frequency Range	Ant.	U , (dB)
CB15 (3m)	CISPR	30MHz ~ 200MHz	V	4.20
		30MHz ~ 200MHz	H	3.64
		200MHz ~ 1,000MHz	V	4.56
		200MHz ~ 1,000MHz	H	3.90

Test Site	Method	Measurement Frequency Range	Ant.	U , (dB)
CB15 (3m)	CISPR	1GHz ~ 6GHz	V	4.46
		1GHz ~ 6GHz	H	4.40
		6GHz ~ 18GHz	V	3.88
		6GHz ~ 18GHz	H	4.00

Test Site	Method	Measurement Frequency Range	U , (dB)
CB15 (1m)	CISPR	18 ~ 26.5 GHz	4.62
		26.5 ~ 40 GHz	5.12

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR} , as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz: 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz: 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR} .

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	AIM UHF Extension
Brand Name	ADVANTECH
Test Model	AIM-EXT0-0049
Series Model	AIM-EXT0-xxxx (Where “x” may be any alphanumeric character, “-” or blank)
Model Difference	Different model distribute to different area.
Power Source	DC voltage supplied from PAD.
Power Rating	DC 5V
Operation Frequency	903.24 MHz ~ 926.76 MHz
Modulation Technology	ASK
Output Power Max.	25.66 dBm
Products Covered	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)	Channel	Frequency (MHz)
01	903.24	18	911.4	35	919.56
02	903.72	19	911.88	36	920.04
03	904.2	20	912.36	37	920.52
04	904.68	21	912.84	38	921
05	905.16	22	913.32	39	921.48
06	905.64	23	913.8	40	921.96
07	906.12	24	914.28	41	922.44
08	906.6	25	914.76	42	922.92
09	907.08	26	915.24	43	923.4
10	907.56	27	915.72	44	923.88
11	908.04	28	916.2	45	924.36
12	908.52	29	916.68	46	924.84
13	909	30	917.16	47	925.32
14	909.48	31	917.64	48	925.8
15	909.96	32	918.12	49	926.28
16	910.44	33	918.6	50	926.76
17	910.92	34	919.08		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	JOGTEK	ADT-U3A70C2-US	PCB	N/A	3.2

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode Note (1)

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Emission	
Final Test Mode	Description
Mode 1	TX Mode_903.24 MHz

For Radiated / Number of Hopping Channel / Average Time of Occupancy / Hopping Channel Separation Measurement / Bandwidth / Peak Output Power / Antenna Conducted Spurious Emission Test	
Final Test Mode	Description
Mode 1	TX Mode Note (1)

Note:

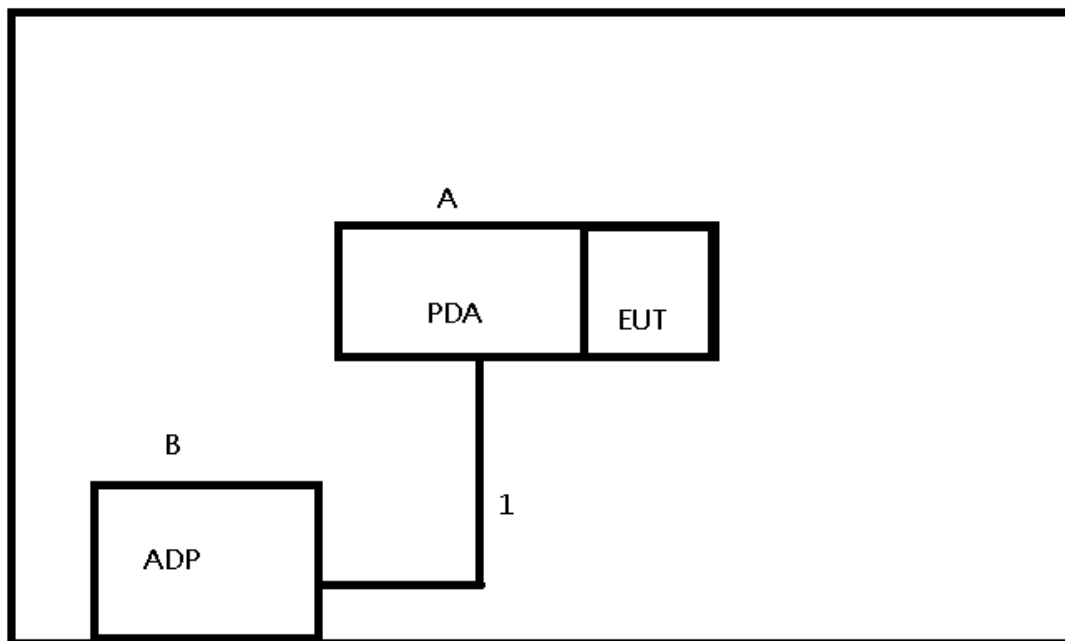
(1) The measurements are performed at the high, middle, low available channels.

3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power 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 power parameters of FHSS

Test Software Version	Jogtek UHF V18.06.04		
Frequency	903.24 MHz	915.24 MHz	926.76 MHz
Parameters	FF	FF	FF

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
A	PDA	AIM	AIM-10	M82-AIM10W	2017SEP10US001
B	Adapter	Tamura	XEW1934N	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.5m	Power Cable

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

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

Note:

- (1) The limit of " * " decreases with the logarithm of the frequency
- (2) 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

The following table is the setting of the receiver

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

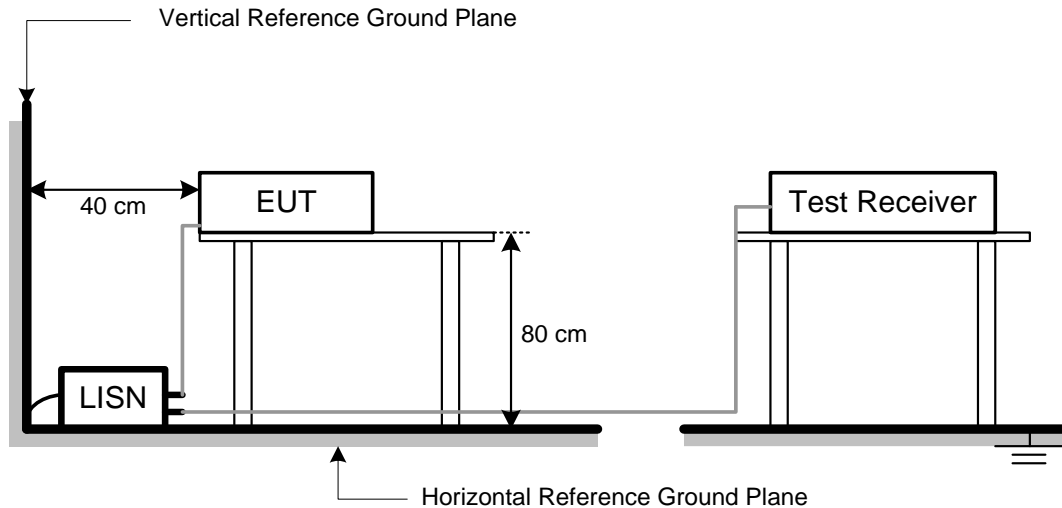
4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling 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 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting/receiving data or hopping on mode.

4.1.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

4.1.7 TEST RESULTS

Please refer to the Appendix A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of "Note". If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform in this case, a "*" marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9KHz -1000MHz)

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

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 EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Spectrum Receiver 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

4.2.2 TEST PROCEDURE

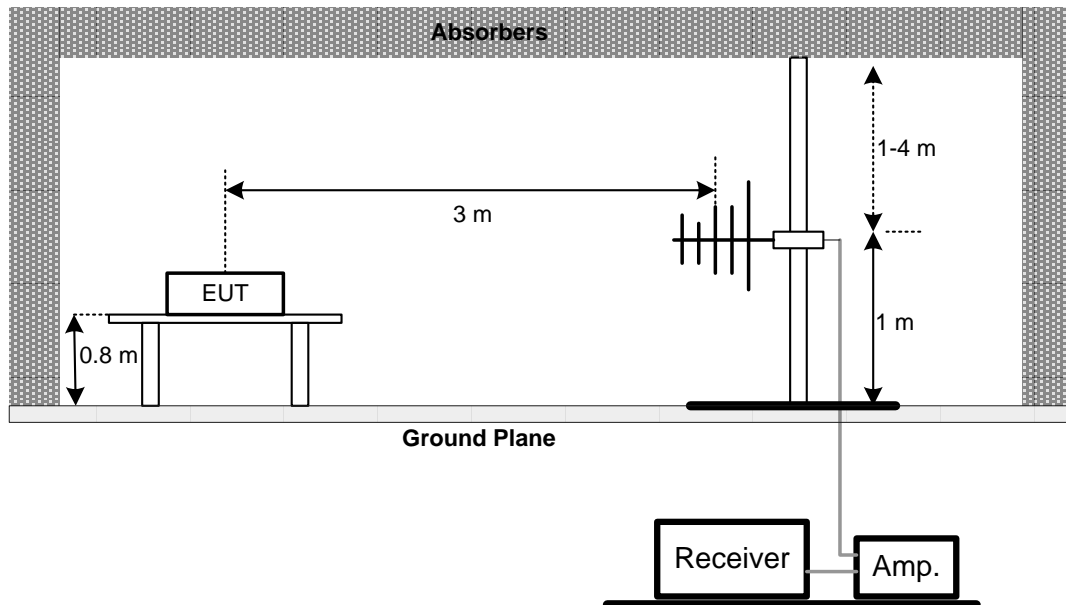
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 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)
- The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; 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.
- 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).
- 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.
- 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.
- 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)
- 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)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

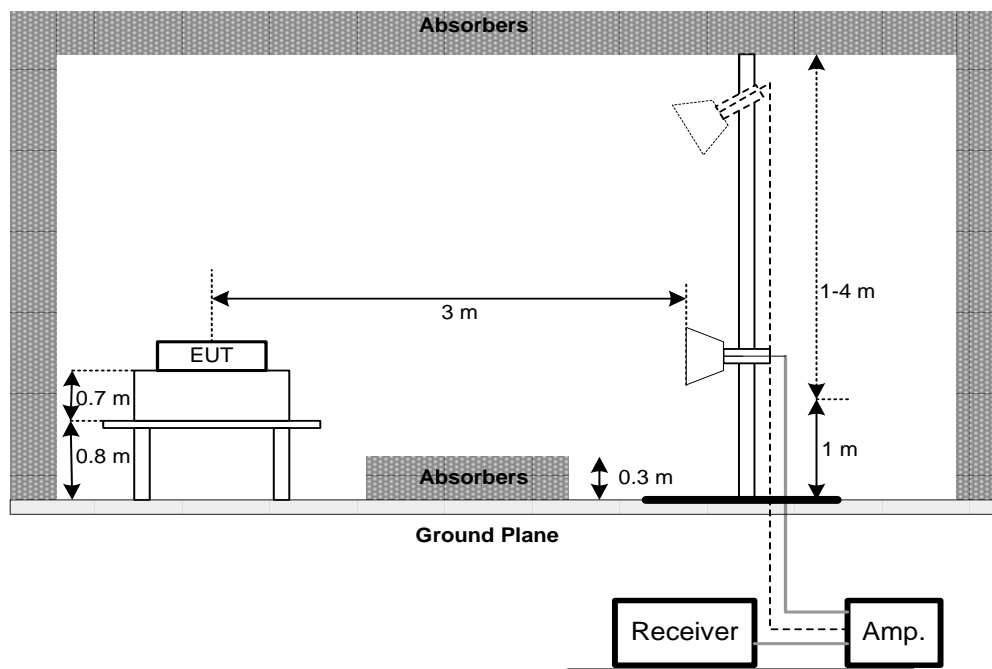
No deviation

4.2.4 TEST SETUP

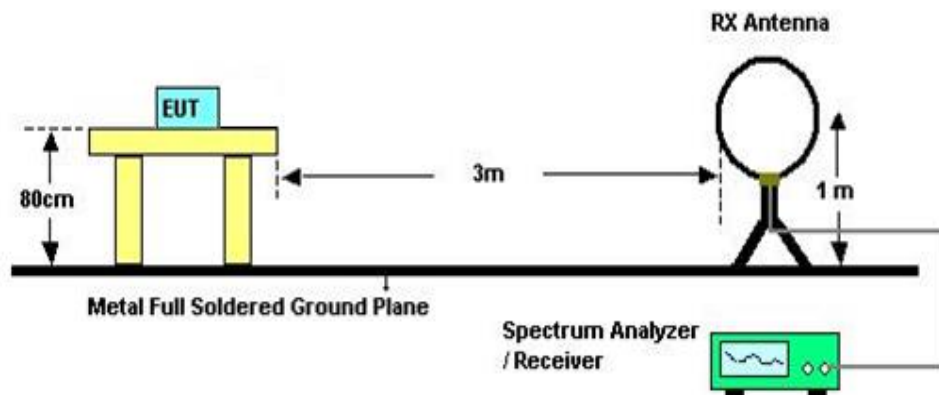
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For Radiated Emissions Below 30MHz



4.2.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.2.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)

Please refer to the Appendix C.

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Appendix D.

Remark:

- (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

5.1.1 TEST PROCEDURE

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

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: AC 120V/60Hz

5.1.6 TEST RESULTS

Please refer to the Appendix E

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

6.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- 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 $1.733 \times 6 = 10.4$ within 6 seconds.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

6.1.6 TEST RESULTS

Please refer to the Appendix F

7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 902-928 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

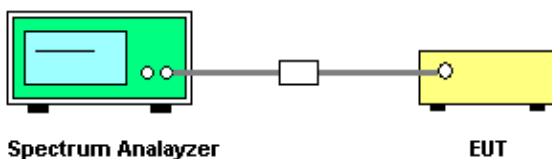
7.1.1 TEST PROCEDURE

- The EUT must have its hopping function enabled
- Span = wide enough to capture the peaks of two adjacent channels
 Resolution (or IF) Bandwidth (RBW) \geq 1% of the span
 Video (or Average) Bandwidth (VBW) \geq RBW
 Sweep = Auto
 Detector function = Peak
 Trace = Max Hold

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT TEST CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: AC 120V/60Hz

7.1.5 TEST RESULTS

Please refer to the Appendix G

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

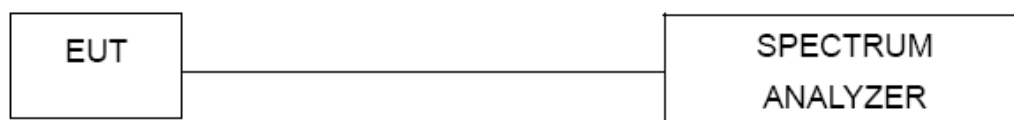
8.1.1 TEST PROCEDURE

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

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

8.1.6 TEST RESULTS

Please refer to the Appendix H

9. PEAK 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) 0.125Watt or 21dBm (hopping channel <75)	902-928	PASS

9.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 1MHz/3MHz, VBW= 1MHz/3MHz, Sweep time = Auto.

9.1.2 DEVIATION FROM STANDARD

No deviation.

9.1.3 TEST SETUP



9.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

9.1.5 EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage: AC 120V/60Hz

9.1.6 TEST RESULTS

Please refer to the Appendix I

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.

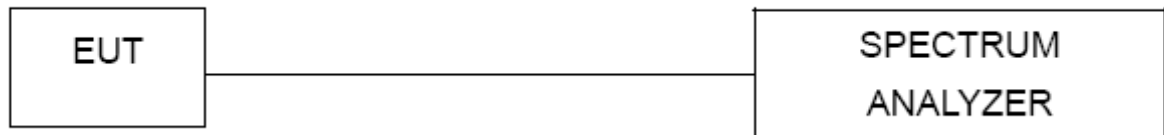
10.1.1 TEST PROCEDURE

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

10.1.2 DEVIATION FROM STANDARD

No deviation.

10.1.3 TEST SETUP



10.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

10.1.5 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

10.1.6 TEST RESULTS

Please refer to the Appendix J

11. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	2018/3/8	2019/3/7
					2019/3/2	2020/3/1
2	Test Cable	EMCI	EMCCFD300-BM-B MR-6000	170715	2018/8/7	2019/8/6
					2019/7/30	2020/7/29
3	EMI Test Receiver	R&S	ESR7	101433	2018/12/10	2019/12/9
					2018/12/5	2019/12/4
4	Measurement Software	EZ	EZ EMC (Version NB-03A)	N/A	N/A	N/A

Radiated Emission Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Preamplifier	EMCI	012645B	980267	2018/4/14	2019/4/13
					2019/4/7	2020/4/6
2	Preamplifier	EMCI	EMC02325	980217	2018/4/14	2019/4/13
					2019/4/7	2020/4/6
3	Test Cable	EMCI	EMC104-SM-SM-8000	8m	2018/4/14	2019/4/13
					2019/4/7	2020/4/6
4	Test Cable	EMCI	EMC104-SM-SM-800	150207	2018/4/14	2019/4/13
					2019/4/7	2020/4/6
5	Test Cable	EMCI	EEMC104-SM-SM-3000	151205	2018/4/14	2019/4/13
					2019/4/7	2020/4/6
6	MXE EMI Receiver	Agilent	N9038A	MY55420127	2018/1/27	2019/1/26
					2019/1/20	2020/1/19
7	Signal Analyzer	Agilent	N9010A	MY52220990	2018/5/22	2019/5/21
					2019/5/15	2020/5/14
8	Loop Ant	EMCI	LPA600	274	2018/5/3	2019/5/2
					2019/4/20	2019/4/19
9	Horn Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	2018/5/2	2019/5/1
					2019/4/21	2020/4/20
10	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-548	2018/3/22	2019/3/21
					2019/3/15	2020/3/14
11	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0623	2018/3/22	2019/3/21
					2019/3/15	2020/3/14

Number of Hopping Channel						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	2018/5/24	2019/5/23
					2019/5/20	2020/5/19

Average Time of Occupancy						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	2018/5/24	2019/5/23
					2019/5/20	2020/5/19

Hopping Channel Separation Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	2018/5/24	2019/5/23
					2019/5/20	2020/5/19

Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	2018/5/24	2019/5/23
					2019/5/20	2020/5/19

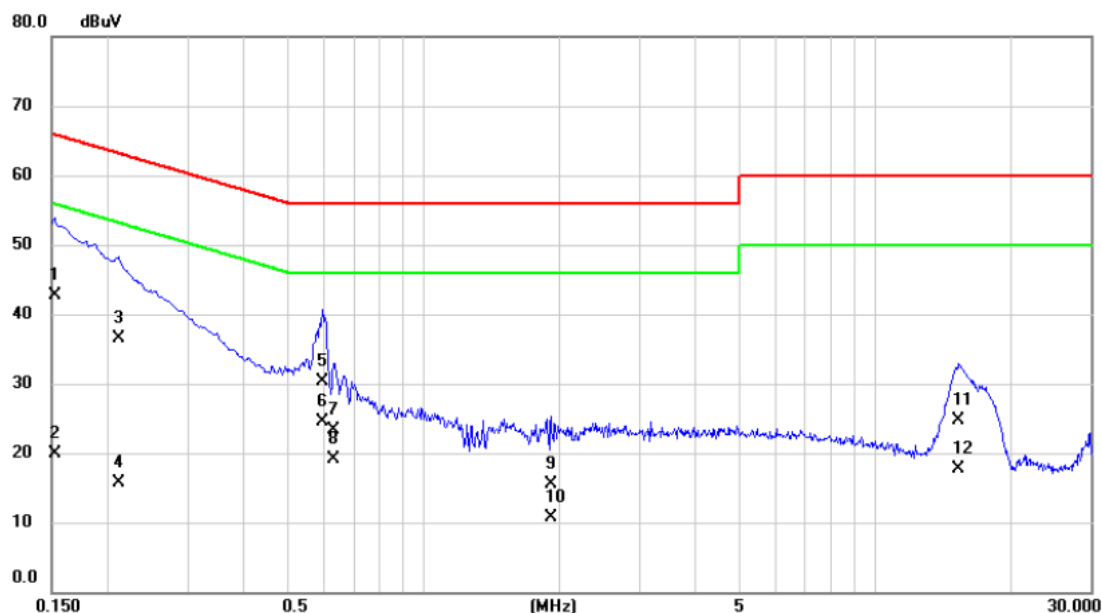
Peak Output Power						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	2018/5/24	2019/5/23
					2019/5/20	2020/5/19

Antenna Conducted Spurious Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	2018/5/24	2019/5/23
					2019/5/20	2020/5/19

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

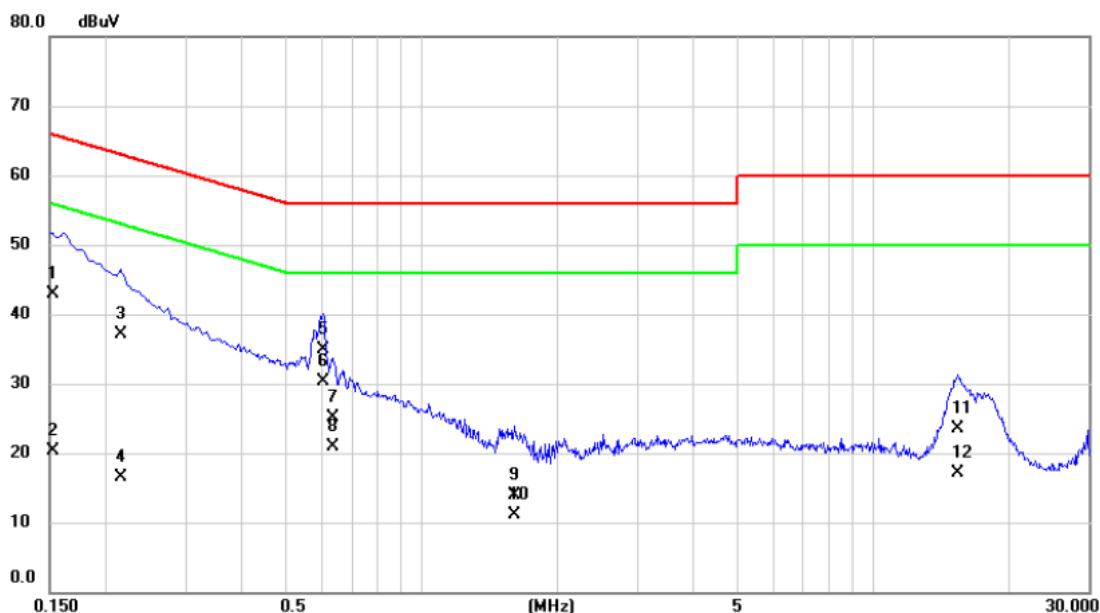
APPENDIX A - CONDUCTED EMISSION

Test Mode	TX Mode_903.24 MHz	Phase	Line
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No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1522	33.10	9.63	42.73	65.88	-23.15	QP	
2	0.1522	10.30	9.63	19.93	55.88	-35.95	AVG	
3	0.2108	26.90	9.63	36.53	63.17	-26.64	QP	
4	0.2108	6.00	9.63	15.63	53.17	-37.54	AVG	
5	0.5977	20.70	9.66	30.36	56.00	-25.64	QP	
6 *	0.5977	14.80	9.66	24.46	46.00	-21.54	AVG	
7	0.6337	13.70	9.66	23.36	56.00	-32.64	QP	
8	0.6337	9.50	9.66	19.16	46.00	-26.84	AVG	
9	1.9095	5.90	9.69	15.59	56.00	-40.41	QP	
10	1.9095	1.10	9.69	10.79	46.00	-35.21	AVG	
11	15.3218	14.80	9.95	24.75	60.00	-35.25	QP	
12	15.3218	7.70	9.95	17.65	50.00	-32.35	AVG	

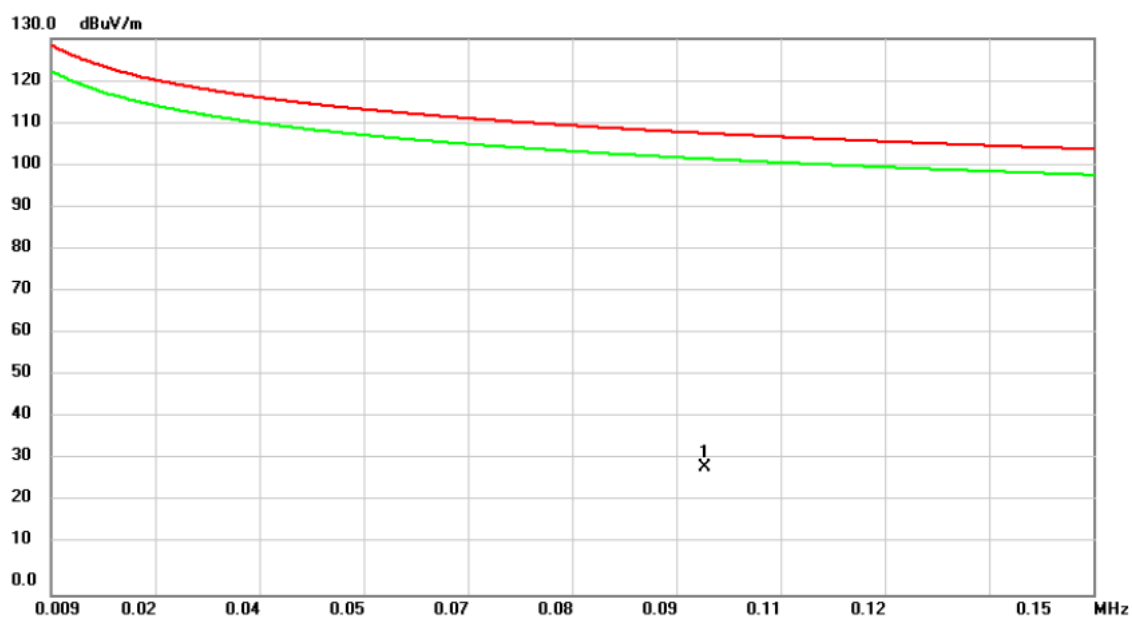
Test Mode	TX Mode_903.24 MHz	Phase	Neutral
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No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1522	33.20	9.62	42.82	65.88	-23.06	QP	
2	0.1522	10.70	9.62	20.32	55.88	-35.56	AVG	
3	0.2153	27.40	9.61	37.01	63.00	-25.99	QP	
4	0.2153	6.80	9.61	16.41	53.00	-36.59	AVG	
5	0.6045	25.30	9.65	34.95	56.00	-21.05	QP	
6 *	0.6045	20.70	9.65	30.35	46.00	-15.65	AVG	
7	0.6360	15.40	9.65	25.05	56.00	-30.95	QP	
8	0.6360	11.20	9.65	20.85	46.00	-25.15	AVG	
9	1.6057	4.30	9.67	13.97	56.00	-42.03	QP	
10	1.6057	1.40	9.67	11.07	46.00	-34.93	AVG	
11	15.4230	13.60	9.95	23.55	60.00	-36.45	QP	
12	15.4230	7.20	9.95	17.15	50.00	-32.85	AVG	

APPENDIX B - RADIATED EMISSION (9KHZ-30MHZ)

Test Mode	TX Mode_903.24 MHz	Azimuth Angle	90°
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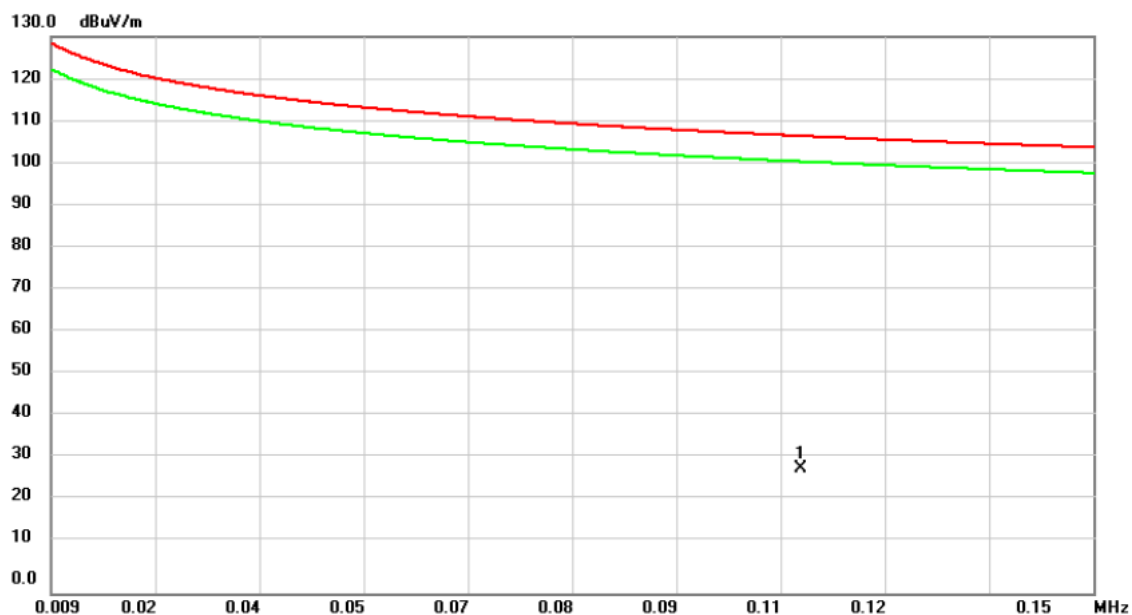
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	0.0974	13.39	16.37	29.76	107.83	-78.07	QP	

Test Mode	TX Mode_903.24 MHz	Azimuth Angle	90°
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	0.5878	29.18	2.72	31.90	72.22	-40.32	QP	
2		2.5778	28.72	-3.35	25.37	69.54	-44.17	QP	
3		6.6374	28.82	-4.09	24.73	69.54	-44.81	QP	
4		8.9458	29.09	-4.69	24.40	69.54	-45.14	QP	
5		11.5725	28.95	-4.81	24.14	69.54	-45.40	QP	
6		14.4780	29.40	-4.92	24.48	69.54	-45.06	QP	

Test Mode	TX Mode_903.24 MHz	Azimuth Angle	0°
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	0.1105	13.79	15.43	29.22	106.74	-77.52	AVG	

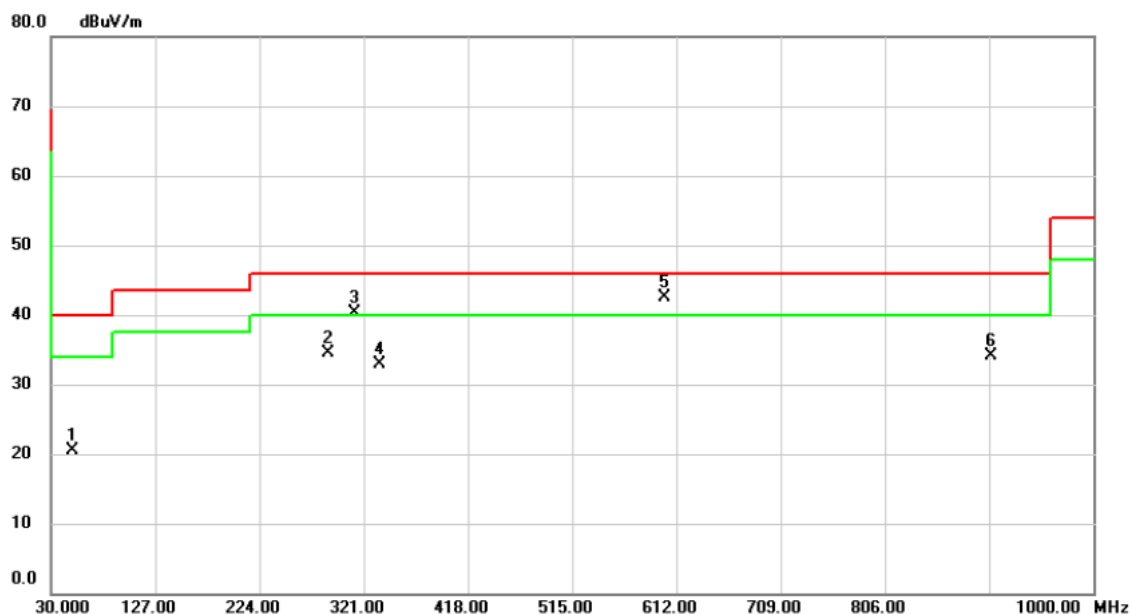
Test Mode	TX Mode_903.24 MHz	Azimuth Angle	0°
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		0.3092	29.16	6.81	35.97	97.80	-61.83	QP	
2	*	1.3838	29.21	-1.34	27.87	64.78	-36.91	QP	
3		3.1350	28.73	-3.67	25.06	69.54	-44.48	QP	
4		6.2394	29.91	-4.05	25.86	69.54	-43.68	QP	
5		8.7468	29.16	-4.61	24.55	69.54	-44.99	QP	
6		11.6522	29.74	-4.81	24.93	69.54	-44.61	QP	

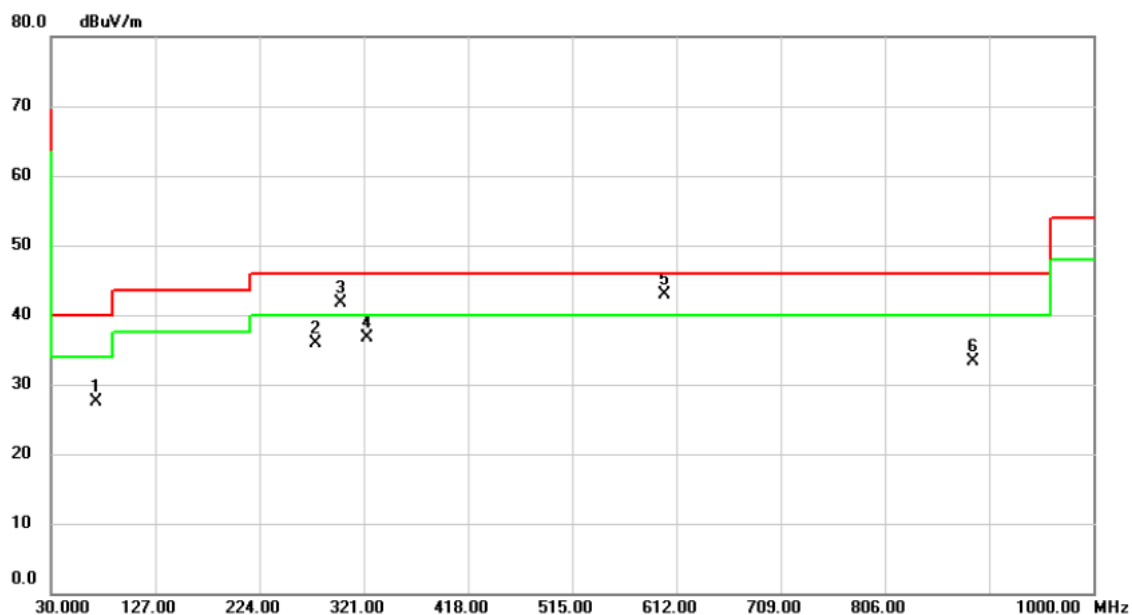
APPENDIX C - RADIATED EMISSION (30MHZ TO 1000MHZ)

Test Mode	TX Mode_903.24 MHz	Polarization	Vertical
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		49.4000	28.56	-8.05	20.51	40.00	-19.49	QP	
2		288.0200	42.26	-7.73	34.53	46.00	-11.47	QP	
3	I	312.2700	47.57	-7.18	40.39	46.00	-5.61	QP	
4		335.5500	39.54	-6.58	32.96	46.00	-13.04	QP	
5	*	600.3600	42.84	-0.41	42.43	46.00	-3.57	QP	
6		904.9400	29.00	5.06	34.06	46.00	-11.94	QP	

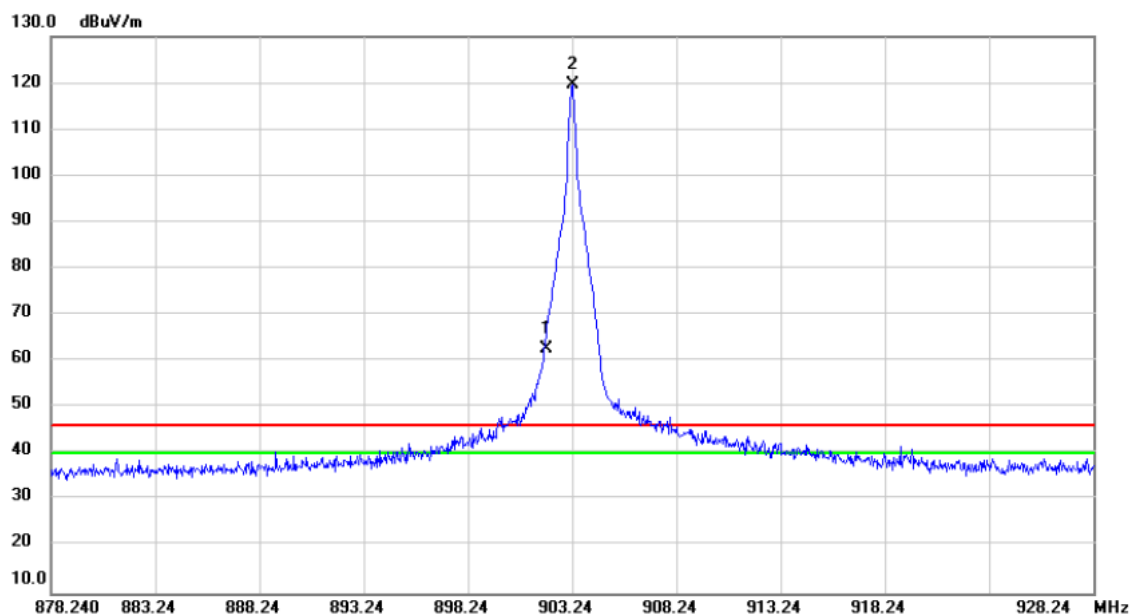
Test Mode	TX Mode_903.24 MHz	Polarization	Horizontal
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		71.7100	38.48	-11.01	27.47	40.00	-12.53	QP	
2		276.3800	43.70	-7.88	35.82	46.00	-10.18	QP	
3	I	299.6600	49.21	-7.52	41.69	46.00	-4.31	QP	
4		323.9100	43.59	-6.88	36.71	46.00	-9.29	QP	
5	*	600.3600	43.32	-0.41	42.91	46.00	-3.09	QP	
6		888.4500	28.64	4.75	33.39	46.00	-12.61	QP	

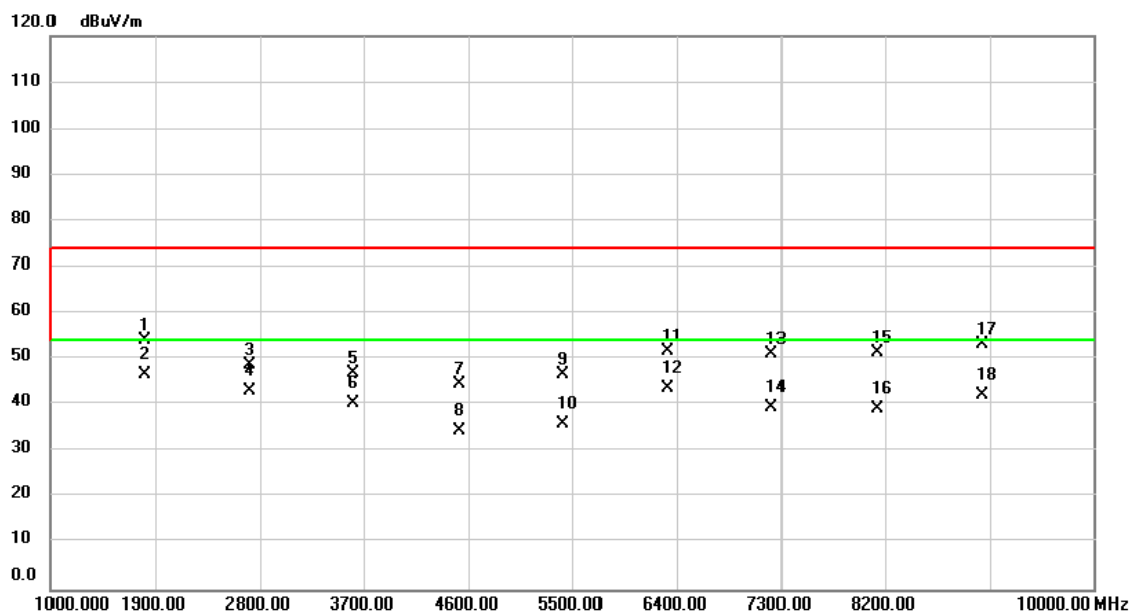
APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

Test Mode	TX Mode 903.24MHz _CH01	Polarization	Vertical
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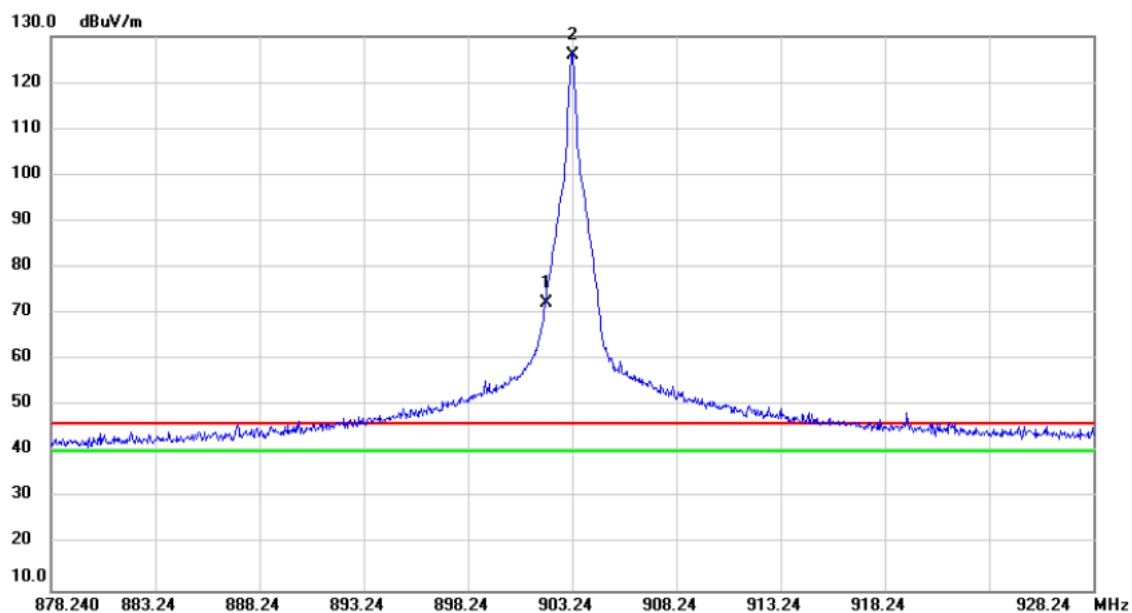
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	901.9990	57.50	5.01	62.51	99.51	-37.00	QP	
2	*	903.2400	114.48	5.03	119.51	46.00	73.51	QP	No Limit

Test Mode	TX Mode 903.24MHz _CH01	Polarization	Vertical
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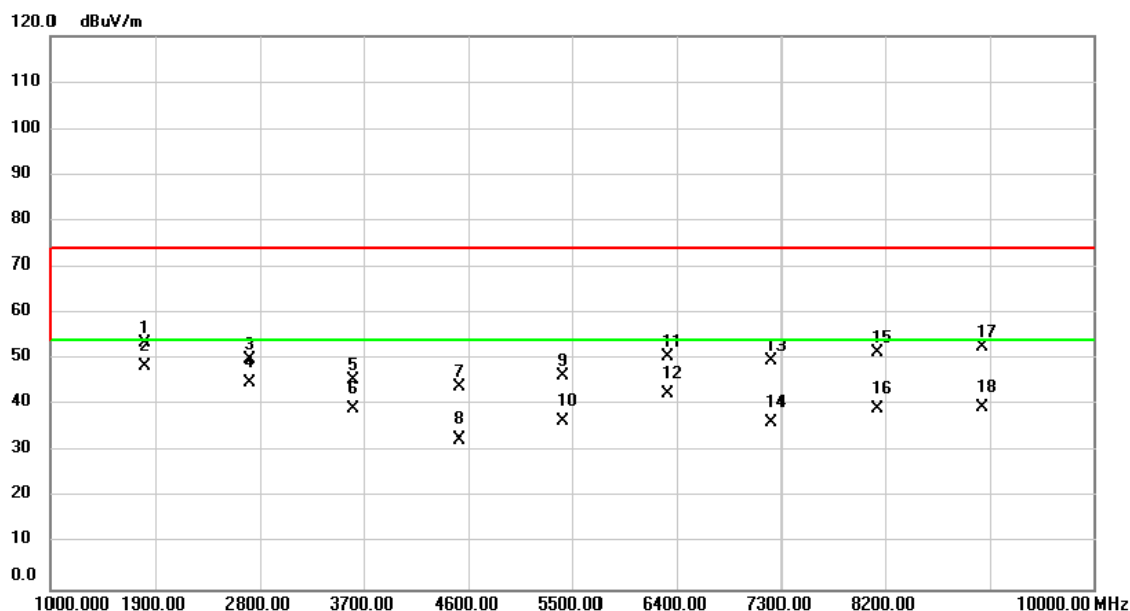
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1806.480	73.57	-19.28	54.29	74.00	-19.71	peak	
2	*	1806.480	66.06	-19.28	46.78	54.00	-7.22	AVG	
3		2709.720	64.69	-16.07	48.62	74.00	-25.38	peak	
4		2709.720	59.24	-16.07	43.17	54.00	-10.83	AVG	
5		3612.960	61.32	-14.47	46.85	74.00	-27.15	peak	
6		3612.960	54.71	-14.47	40.24	54.00	-13.76	AVG	
7		4516.200	56.32	-11.77	44.55	74.00	-29.45	peak	
8		4516.200	46.15	-11.77	34.38	54.00	-19.62	AVG	
9		5419.440	57.53	-10.95	46.58	74.00	-27.42	peak	
10		5419.440	46.78	-10.95	35.83	54.00	-18.17	AVG	
11		6322.680	60.27	-8.58	51.69	74.00	-22.31	peak	
12		6322.680	52.25	-8.58	43.67	54.00	-10.33	AVG	
13		7225.920	56.60	-5.31	51.29	74.00	-22.71	peak	
14		7225.920	44.87	-5.31	39.56	54.00	-14.44	AVG	
15		8129.160	54.08	-2.65	51.43	74.00	-22.57	peak	
16		8129.160	41.85	-2.65	39.20	54.00	-14.80	AVG	
17		9032.400	54.49	-1.34	53.15	74.00	-20.85	peak	
18		9032.400	43.56	-1.34	42.22	54.00	-11.78	AVG	

Test Mode	TX Mode 903.24MHz _CH01	Polarization	Horizontal
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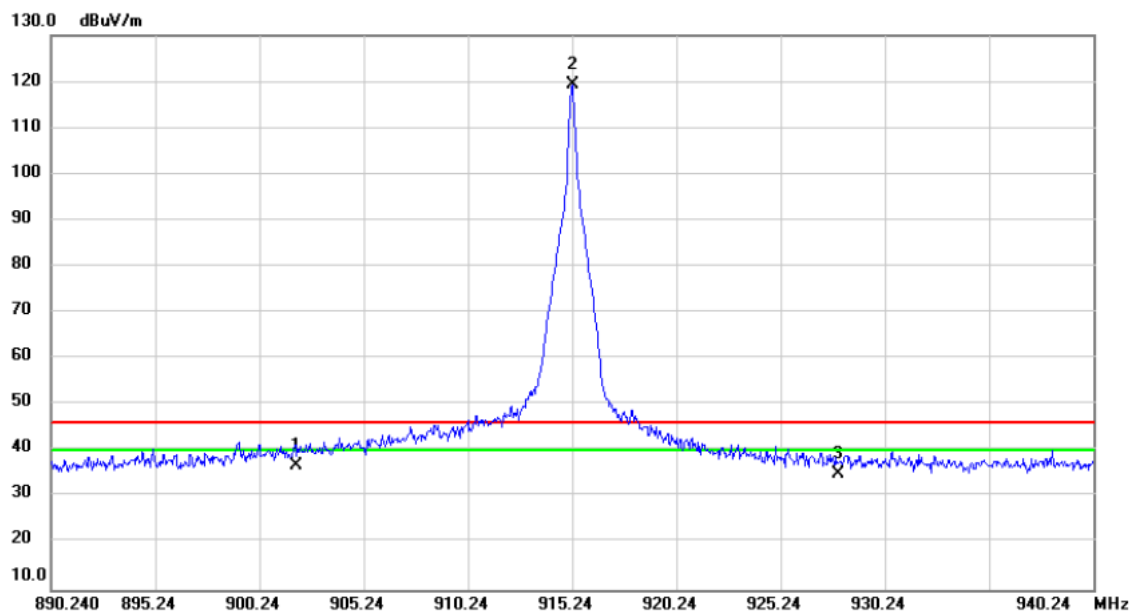
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	901.9990	67.23	5.01	72.24	106.08	-33.24	QP	
2	*	903.2400	121.05	5.03	126.08	46.00	80.08	QP	No Limit

Test Mode	TX Mode 903.24MHz _CH01	Polarization	Horizontal
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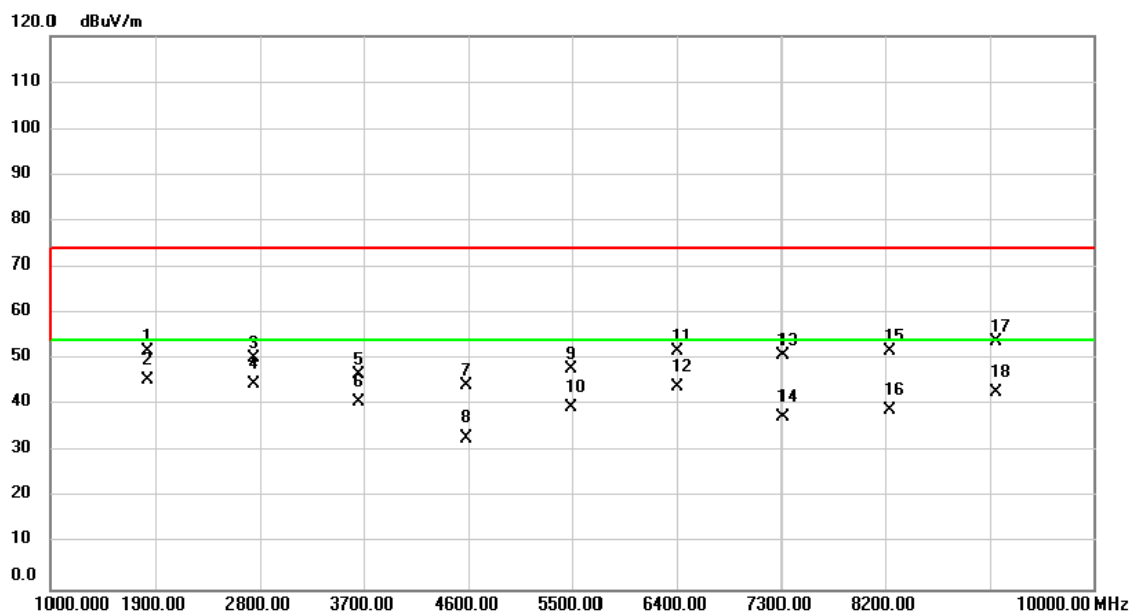
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1806.480	72.87	-19.28	53.59	74.00	-20.41	peak	
2	*	1806.480	67.65	-19.28	48.37	54.00	-5.63	AVG	
3		2709.720	66.03	-16.07	49.96	74.00	-24.04	peak	
4		2709.720	61.05	-16.07	44.98	54.00	-9.02	AVG	
5		3612.960	59.83	-14.47	45.36	74.00	-28.64	peak	
6		3612.960	53.50	-14.47	39.03	54.00	-14.97	AVG	
7		4516.200	55.87	-11.77	44.10	74.00	-29.90	peak	
8		4516.200	44.44	-11.77	32.67	54.00	-21.33	AVG	
9		5419.440	57.36	-10.95	46.41	74.00	-27.59	peak	
10		5419.440	47.46	-10.95	36.51	54.00	-17.49	AVG	
11		6322.680	59.11	-8.58	50.53	74.00	-23.47	peak	
12		6322.680	51.18	-8.58	42.60	54.00	-11.40	AVG	
13		7225.920	54.95	-5.31	49.64	74.00	-24.36	peak	
14		7225.920	41.46	-5.31	36.15	54.00	-17.85	AVG	
15		8129.160	54.17	-2.65	51.52	74.00	-22.48	peak	
16		8129.160	41.81	-2.65	39.16	54.00	-14.84	AVG	
17		9032.400	53.93	-1.34	52.59	74.00	-21.41	peak	
18		9032.400	40.76	-1.34	39.42	54.00	-14.58	AVG	

Test Mode	TX Mode 915.24MHz _CH26	Polarization	Vertical
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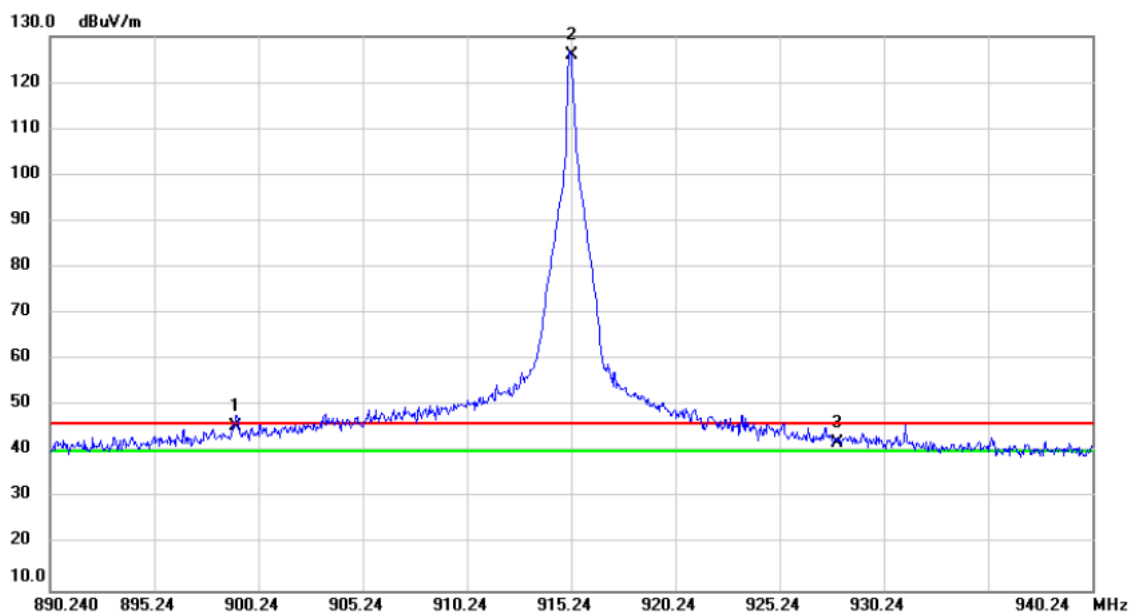
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		901.9990	31.91	5.01	36.92	99.24	-62.32	QP	
2	*	915.2400	114.02	5.22	119.24	46.00	73.24	QP	No Limit
3		928.0010	29.55	5.44	34.99	99.24	-64.25	QP	

Test Mode	TX Mode 915.24MHz _CH26	Polarization	Vertical
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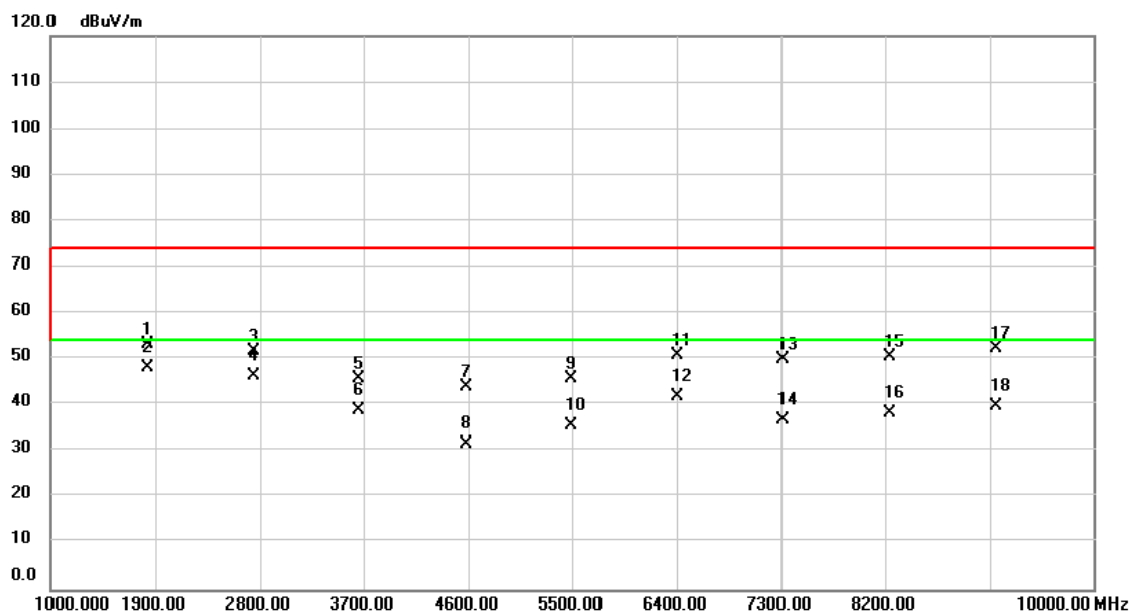
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1830.480	70.85	-19.22	51.63	74.00	-22.37	peak	
2	*	1830.480	64.63	-19.22	45.41	54.00	-8.59	AVG	
3		2745.720	66.27	-15.95	50.32	74.00	-23.68	peak	
4		2745.720	60.52	-15.95	44.57	54.00	-9.43	AVG	
5		3660.960	60.87	-14.30	46.57	74.00	-27.43	peak	
6		3660.960	54.81	-14.30	40.51	54.00	-13.49	AVG	
7		4576.200	55.84	-11.73	44.11	74.00	-29.89	peak	
8		4576.200	44.44	-11.73	32.71	54.00	-21.29	AVG	
9		5491.440	58.76	-10.90	47.86	74.00	-26.14	peak	
10		5491.440	50.27	-10.90	39.37	54.00	-14.63	AVG	
11		6406.680	60.05	-8.31	51.74	74.00	-22.26	peak	
12		6406.680	52.24	-8.31	43.93	54.00	-10.07	AVG	
13		7321.920	55.74	-4.95	50.79	74.00	-23.21	peak	
14		7321.920	42.34	-4.95	37.39	54.00	-16.61	AVG	
15		8237.160	54.50	-2.81	51.69	74.00	-22.31	peak	
16		8237.160	41.57	-2.81	38.76	54.00	-15.24	AVG	
17		9152.400	54.89	-1.02	53.87	74.00	-20.13	peak	
18		9152.400	43.72	-1.02	42.70	54.00	-11.30	AVG	

Test Mode	TX Mode 915.24MHz _CH26	Polarization	Horizontal
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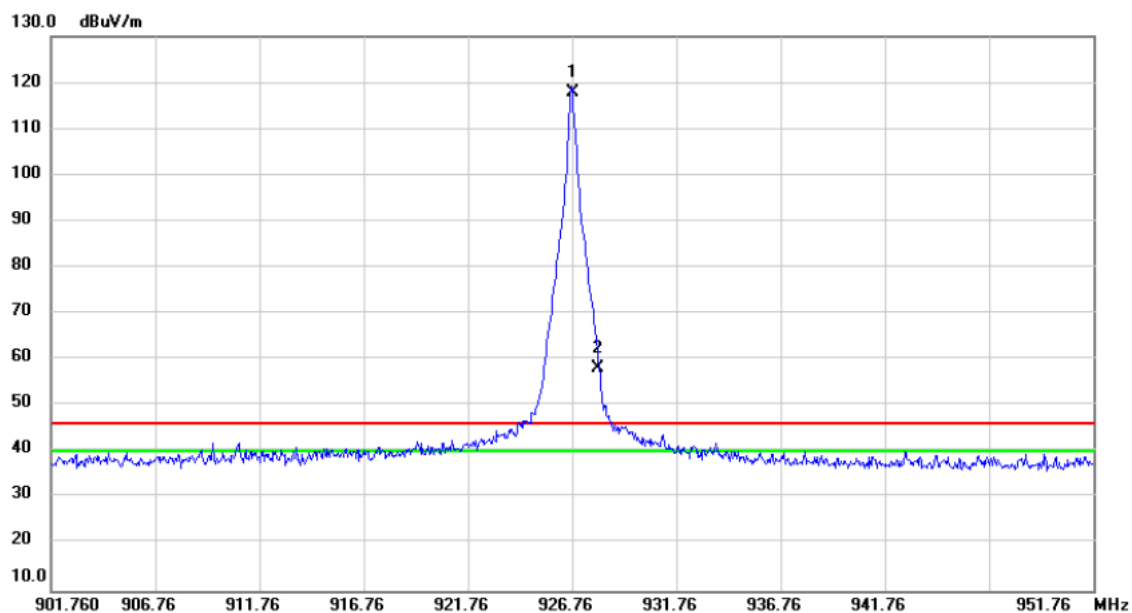
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	!	899.1400	40.50	4.97	45.47	105.83	-60.36	QP	
2	*	915.2400	120.61	5.22	125.83	46.00	79.83	QP	No Limit
3	!	928.0010	36.52	5.44	41.96	105.83	-63.87	QP	

Test Mode	TX Mode 915.24MHz _CH26	Polarization	Horizontal
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1830.480	72.52	-19.22	53.30	74.00	-20.70	peak	
2	*	1830.480	67.30	-19.22	48.08	54.00	-5.92	AVG	
3		2745.720	67.73	-15.95	51.78	74.00	-22.22	peak	
4		2745.720	62.40	-15.95	46.45	54.00	-7.55	AVG	
5		3660.960	60.19	-14.30	45.89	74.00	-28.11	peak	
6		3660.960	53.07	-14.30	38.77	54.00	-15.23	AVG	
7		4576.200	55.65	-11.73	43.92	74.00	-30.08	peak	
8		4576.200	43.38	-11.73	31.65	54.00	-22.35	AVG	
9		5491.440	56.64	-10.90	45.74	74.00	-28.26	peak	
10		5491.440	46.44	-10.90	35.54	54.00	-18.46	AVG	
11		6406.680	59.03	-8.31	50.72	74.00	-23.28	peak	
12		6406.680	50.13	-8.31	41.82	54.00	-12.18	AVG	
13		7321.920	54.83	-4.95	49.88	74.00	-24.12	peak	
14		7321.920	41.79	-4.95	36.84	54.00	-17.16	AVG	
15		8237.160	53.39	-2.81	50.58	74.00	-23.42	peak	
16		8237.160	41.12	-2.81	38.31	54.00	-15.69	AVG	
17		9152.400	53.22	-1.02	52.20	74.00	-21.80	peak	
18		9152.400	40.81	-1.02	39.79	54.00	-14.21	AVG	

Test Mode	TX Mode 926.76MHz _CH50	Polarization	Vertical
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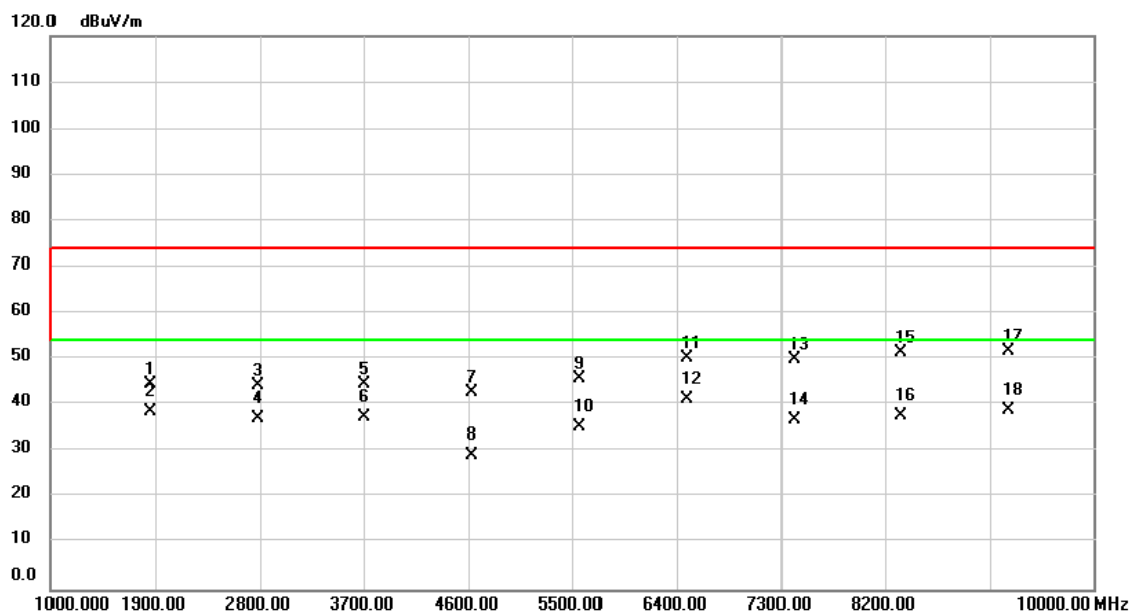


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	926.7600	112.52	5.42	117.94	46.00	71.94	QP	No Limit
2	X	928.0010	52.72	5.44	58.16	97.94	-39.78	QP	

Test Mode TX Mode 926.76MHz _CH50

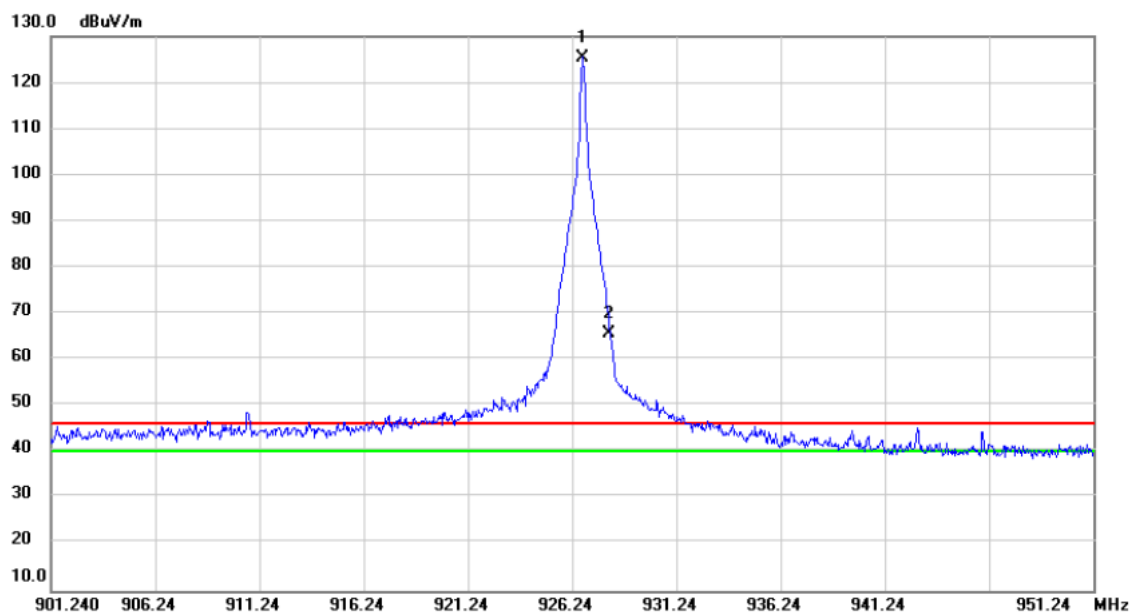
Polarization

Vertical



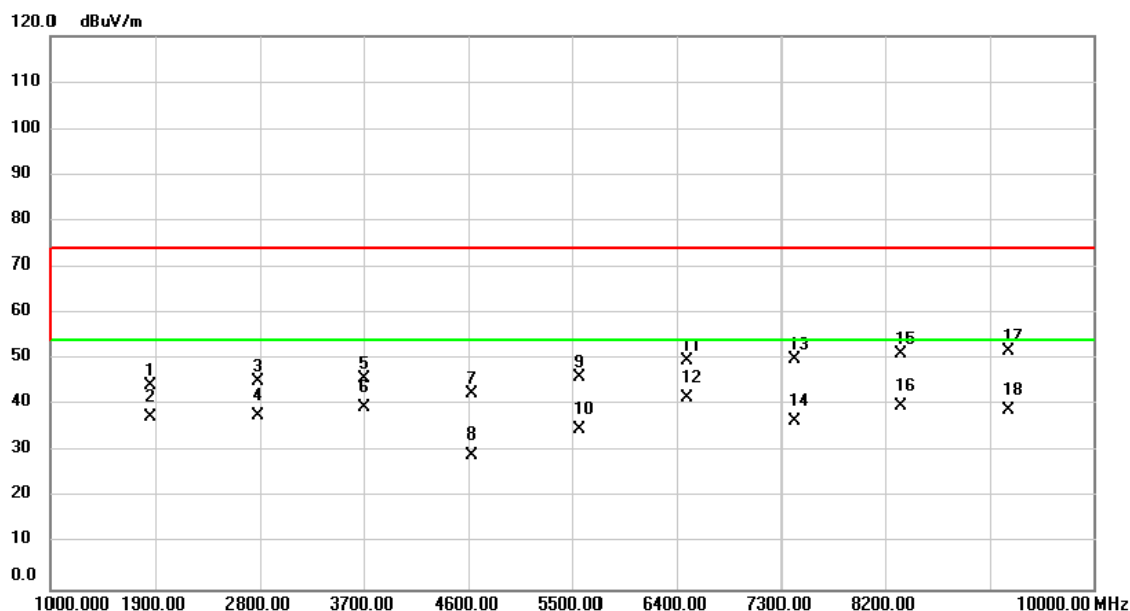
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1853.520	63.73	-19.17	44.56	74.00	-29.44	peak	
2		1853.520	57.74	-19.17	38.57	54.00	-15.43	AVG	
3		2780.280	60.05	-15.83	44.22	74.00	-29.78	peak	
4		2780.280	52.90	-15.83	37.07	54.00	-16.93	AVG	
5		3707.040	58.66	-14.14	44.52	74.00	-29.48	peak	
6		3707.040	51.46	-14.14	37.32	54.00	-16.68	AVG	
7		4633.800	54.36	-11.67	42.69	74.00	-31.31	peak	
8		4633.800	41.04	-11.67	29.37	54.00	-24.63	AVG	
9		5560.560	56.48	-10.72	45.76	74.00	-28.24	peak	
10		5560.560	45.82	-10.72	35.10	54.00	-18.90	AVG	
11		6487.320	58.26	-8.06	50.20	74.00	-23.80	peak	
12	*	6487.320	49.41	-8.06	41.35	54.00	-12.65	AVG	
13		7414.080	54.51	-4.63	49.88	74.00	-24.12	peak	
14		7414.080	41.23	-4.63	36.60	54.00	-17.40	AVG	
15		8340.840	54.50	-2.97	51.53	74.00	-22.47	peak	
16		8340.840	40.73	-2.97	37.76	54.00	-16.24	AVG	
17		9267.600	52.39	-0.71	51.68	74.00	-22.32	peak	
18		9267.600	39.43	-0.71	38.72	54.00	-15.28	AVG	

Test Mode	TX Mode 926.76MHz _CH50	Polarization	Horizontal
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	926.7600	119.98	5.42	125.40	46.00	79.40	QP	No Limit
2	X	928.0010	60.28	5.44	65.72	105.40	-39.68	QP	

Test Mode	TX Mode 926.76MHz _CH50	Polarization	Horizontal
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1853.520	63.30	-19.17	44.13	74.00	-29.87	peak	
2		1853.520	56.50	-19.17	37.33	54.00	-16.67	AVG	
3		2780.280	60.90	-15.83	45.07	74.00	-28.93	peak	
4		2780.280	53.47	-15.83	37.64	54.00	-16.36	AVG	
5		3707.040	59.91	-14.14	45.77	74.00	-28.23	peak	
6		3707.040	53.58	-14.14	39.44	54.00	-14.56	AVG	
7		4633.800	54.18	-11.67	42.51	74.00	-31.49	peak	
8		4633.800	41.06	-11.67	29.39	54.00	-24.61	AVG	
9		5560.560	56.83	-10.72	46.11	74.00	-27.89	peak	
10		5560.560	45.35	-10.72	34.63	54.00	-19.37	AVG	
11		6487.320	57.85	-8.06	49.79	74.00	-24.21	peak	
12	*	6487.320	49.68	-8.06	41.62	54.00	-12.38	AVG	
13		7414.080	54.44	-4.63	49.81	74.00	-24.19	peak	
14		7414.080	41.22	-4.63	36.59	54.00	-17.41	AVG	
15		8340.840	54.06	-2.97	51.09	74.00	-22.91	peak	
16		8340.840	42.81	-2.97	39.84	54.00	-14.16	AVG	
17		9267.600	52.39	-0.71	51.68	74.00	-22.32	peak	
18		9267.600	39.53	-0.71	38.82	54.00	-15.18	AVG	

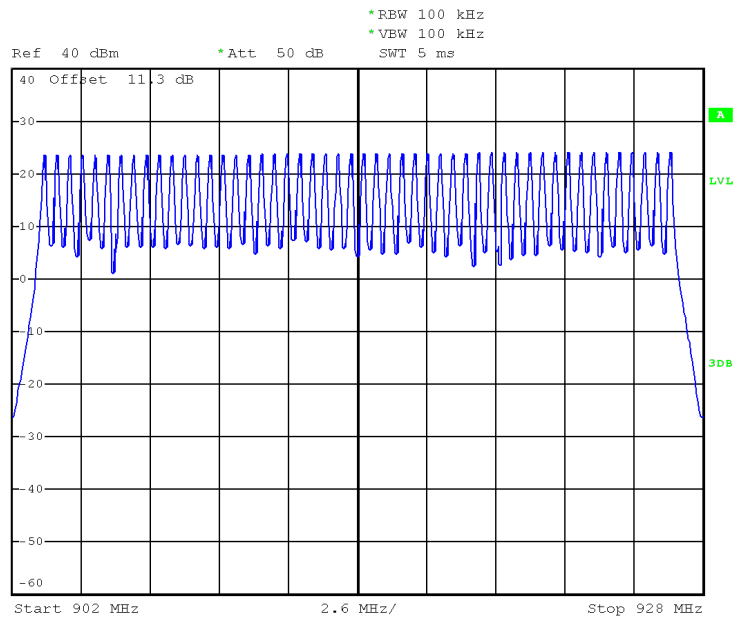
APPENDIX E - NUMBER OF HOPPING CHANNEL

Test Mode

Hopping Mode

Number of Hopping Channel

50



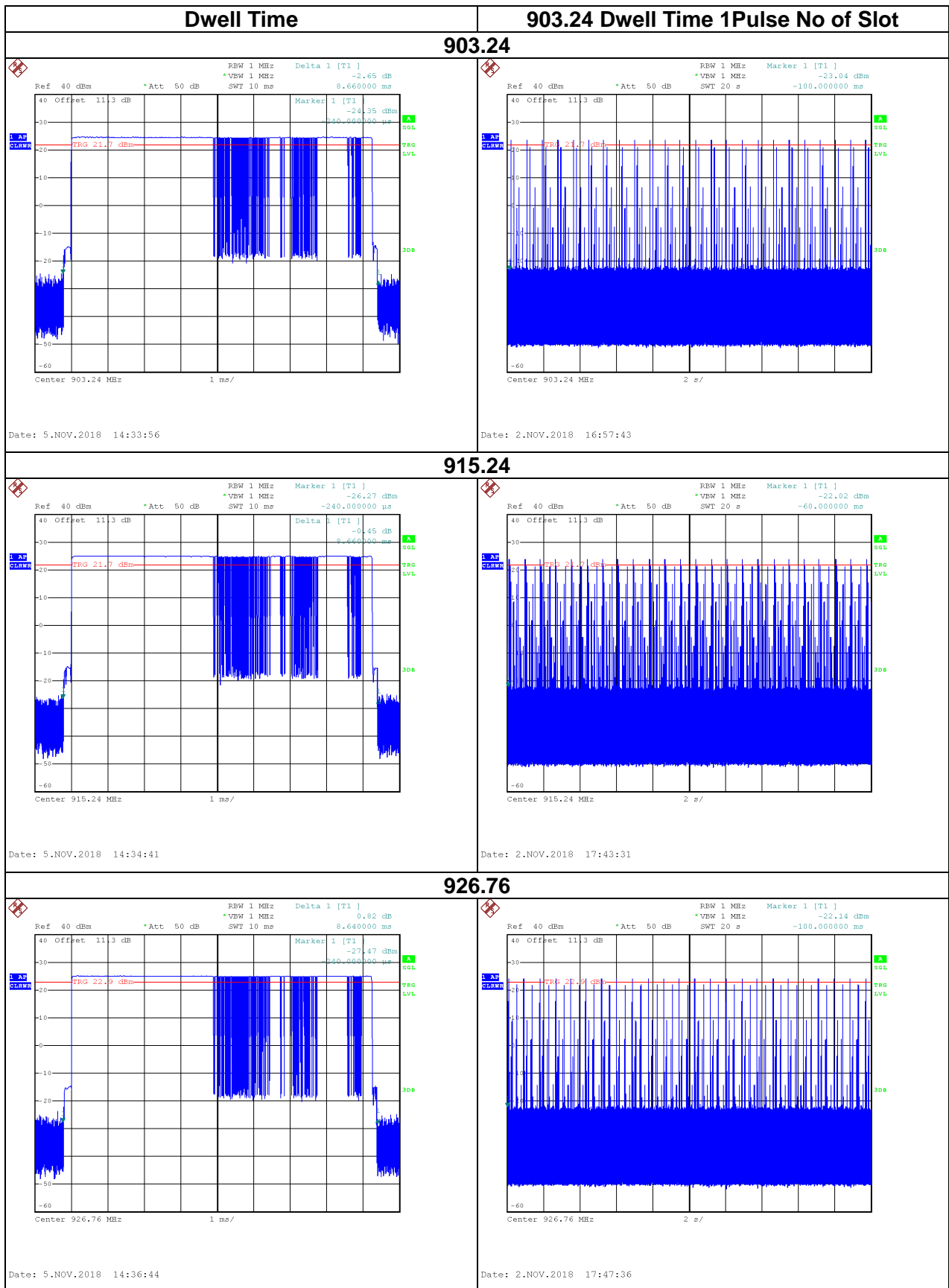
Date: 2.NOV.2018 16:08:14

APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode :	TX Mode
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Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
903.24 MHz	8.6600	0.2078	0.4000	Pass
915.24 MHz	8.6600	0.2078	0.4000	Pass
926.76 MHz	8.6400	0.1987	0.4000	Pass

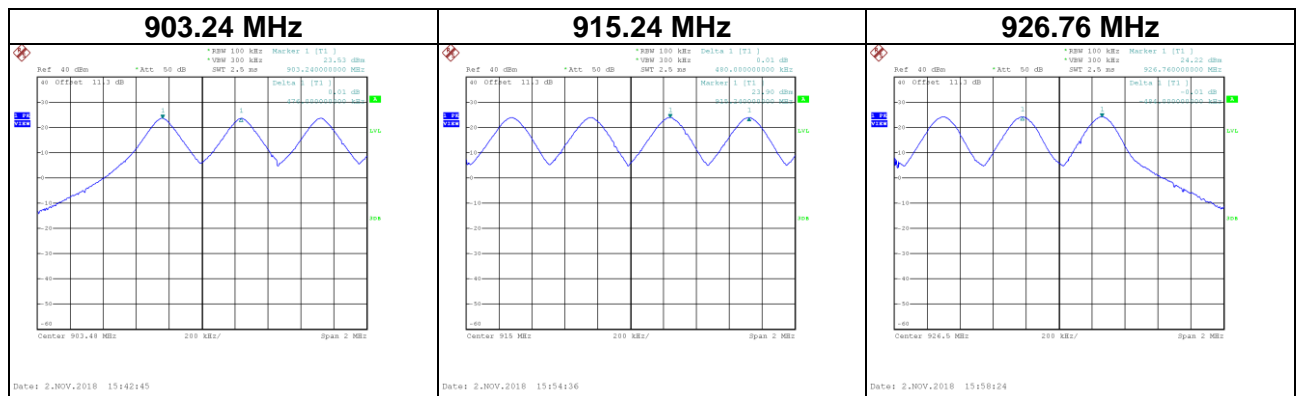
$\text{Dwell Time} = \text{Pulse Time(s)} * \text{Channel hopping rate} * \text{Occupancy Time Limit}$
 $\text{Occupancy Time Limit} = 0.4 * \text{Channel}$



APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT

Test Mode :	Hopping on
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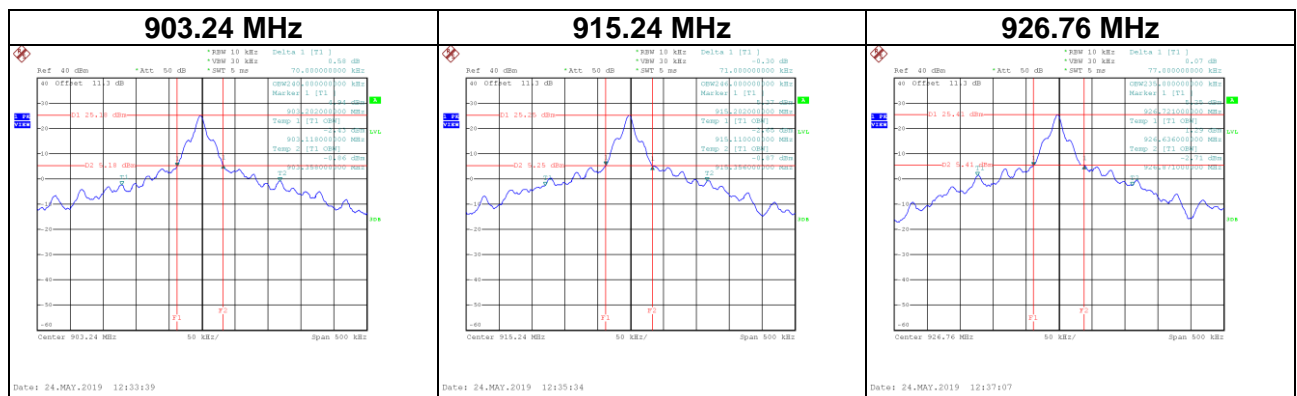
Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
903.24	0.476	0.047	Pass
915.24	0.480	0.048	Pass
926.76	0.484	0.049	Pass



APPENDIX H - BANDWIDTH

Test Mode :	TX Mode
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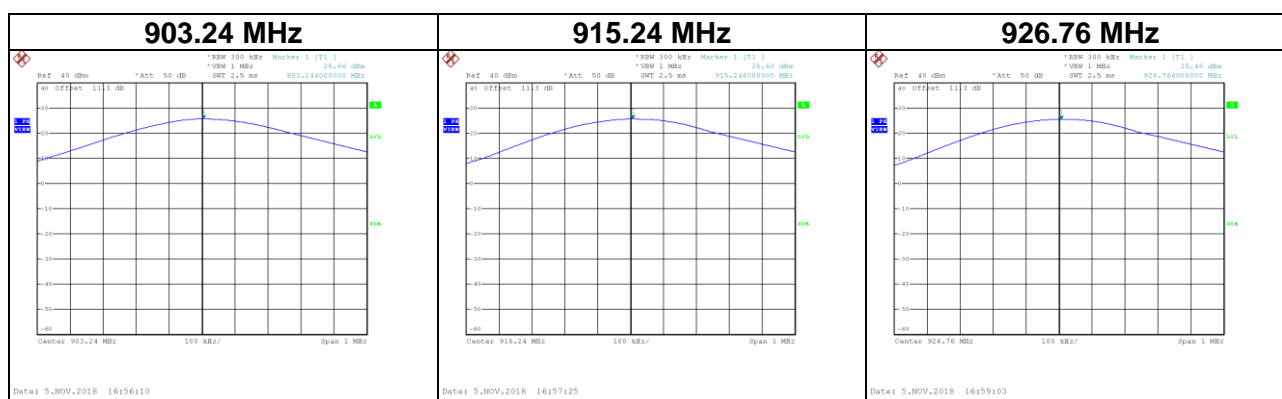
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
903.24	0.070	0.240	Pass
915.24	0.071	0.246	Pass
926.76	0.077	0.235	Pass



APPENDIX I - PEAK OUTPUT POWER

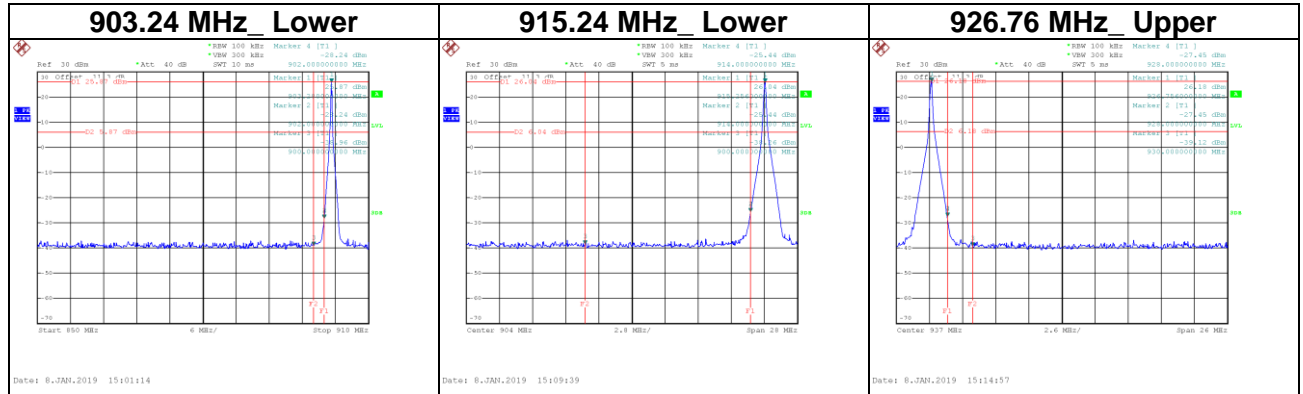
Test Mode :	TX Mode
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Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
903.24	25.66	0.3681	30.00	1.00	Pass
915.24	25.60	0.3631	30.00	1.00	Pass
926.76	25.48	0.3532	30.00	1.00	Pass

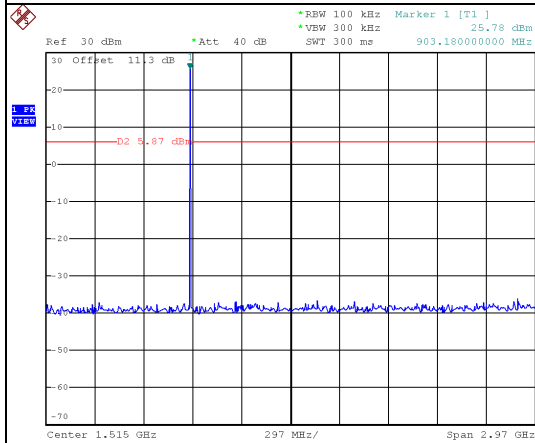


APPENDIX J - ANTENNA CONDUCTED SPURIOUS EMISSION

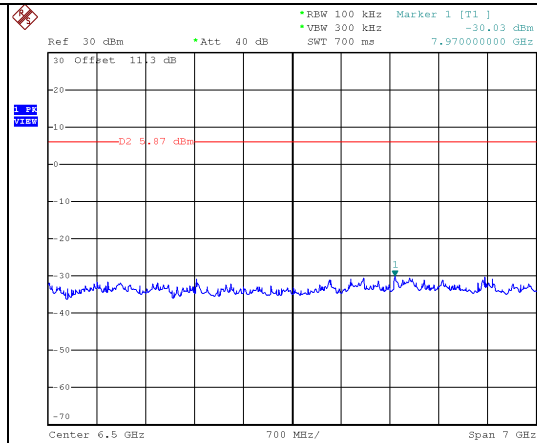
Test Mode : TX Mode



903.24 MHz – 10 Harmonics

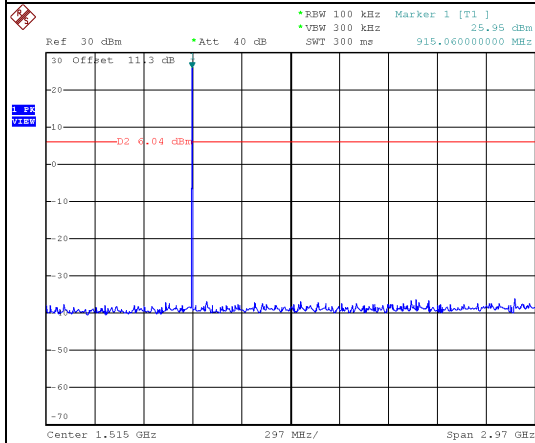


Date: 8.JAN.2019 15:03:28

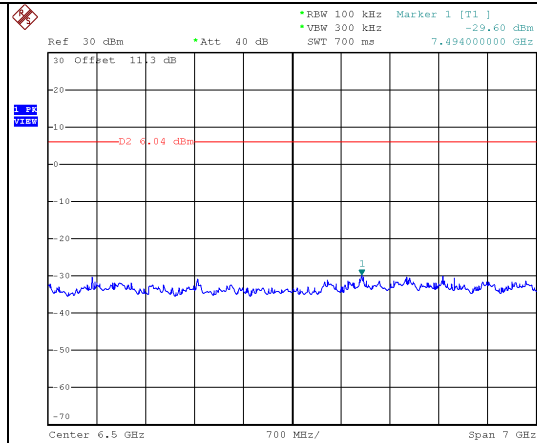


Date: 8.JAN.2019 15:05:08

915.24 MHz – 10 Harmonics

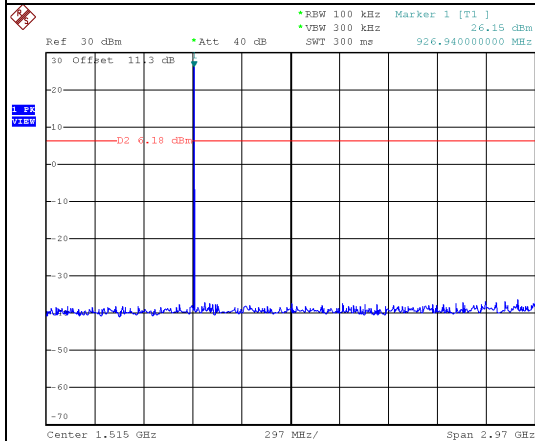


Date: 8.JAN.2019 15:10:40

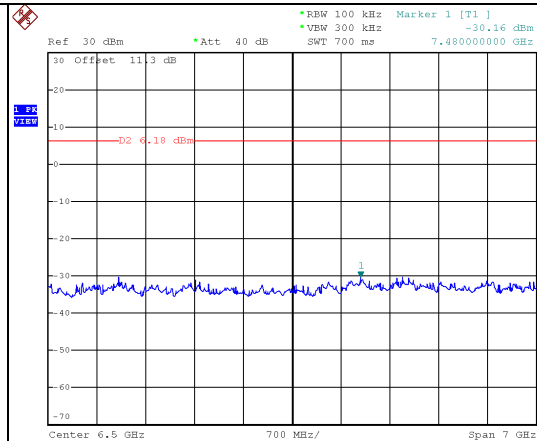


Date: 8.JAN.2019 15:11:34

926.76 MHz – 10 Harmonics



Date: 8.JAN.2019 15:15:37



Date: 8.JAN.2019 15:16:18

End of Test Report