

FCC Radio Test Report

FCC ID: 2ARXM9502PP

Original Grant

Report No. : TB-FCC162453
Applicant : Shenzhen Huitonexing Electronic Co.,Ltd.
Equipment Under Test (EUT)
EUT Name : RFID Reader
Model No. : 9502
Series Model No. : 9502E, 9511, 9511E, 9512, 9512E, 9514, 9514E, 9518, 9518E, 8201, 8201E, 8203, 8203E, 8502, 8502E, 8503, 8503E
Brand Name : HQS
Receipt Date : 2018-10-27
Test Date : 2018-10-28 to 2018-11-16
Issue Date : 2018-11-30
Standards : FCC Part 15: 2018, Subpart C(15.247)
Test Method : ANSI C63.10: 2013
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer : *Jason Xu* Jason Xu
Engineer Supervisor : *IVAN SU* Ivan Su
Engineer Manager : *Ray Lai* Ray Lai



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TB-FCC162453	Rev.01	Initial issue of report	2018-11-30

1. General Information about EUT

1.1 Client Information

Applicant	:	Shenzhen Huitonexing Electronic Co.,Ltd.
Address	:	Floor 4. East Block, F#, North No.2, Bantian, Longgang District, Shenzhen, China
Manufacturer	:	Shenzhen Huitonexing Electronic Co.,Ltd.
Address	:	Floor 4. East Block, F#, North No.2, Bantian, Longgang District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	RFID Reader	
Models No.	:	9502, 9502E, 9511, 9511E, 9512, 9512E, 9514, 9514E, 9518, 9518E, 8201, 8201E, 8203, 8203E, 8502, 8502E, 8503, 8503E	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name.	
Product Description	:	Operation Frequency:	902.5MHz~927MHz
	:	Modulation Type:	AFSK
	:	RF Output Power:	26.48dBm
	:	Antenna Gain:	8dBi Circular Polarized Antenna
Power Rating	:	Input: DC 9.0 V/3A from the AC/DC Adapter.(ADS-18H-12-2 0918G)	
Software Version	:	N/A	
Hardware Version	:	N/A	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

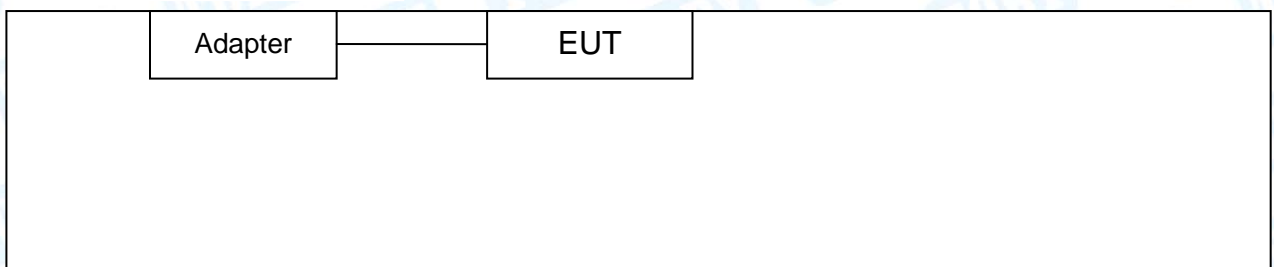
- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Channel List:

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	902.5	19	911.5	37	920.5
02	903	20	912	38	921
03	903.5	21	912.5	39	921.5
04	904	22	913	40	922
05	904.5	23	913.5	41	922.5
06	905	24	914	42	923
07	905.5	25	914.5	43	923.5
08	906	26	915	44	924
09	906.5	27	915.5	45	924.5
10	907	28	916	46	925
11	907.5	29	916.5	47	925.5
12	908	30	917	48	926
13	908.5	31	917.5	49	926.5
14	909	32	918	50	927
15	909.5	33	918.5		
16	910	34	919		
17	910.5	35	919.5		
18	911	36	920		

(3) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode


1.4 Description of Support Units

Equipment Information				
Name	Model	FCC ID/VOC	Manufacturer	Used "√"
ADAPTER	ADS-18H-12-2 0918G	----	/	√

1.5 Description of Test Mode

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 follow was evaluated respectively.

For Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	TX AFSK Mode
Mode 2	TX Mode(AFSK) Channel 00/26/50
Mode 3	Hopping Mode(AFSK)

Note:

- (1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate. We have pretested all the test modes above.
According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels.
- (2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test 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 Bluetooth mode.

Test Software Version	N/A		
Frequency	902.5 MHz	915MHz	927 MHz
AFSK	DEF	DEF	DEF

1.7 Measurement Uncertainty

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 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.42 dB ± 3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 2				
Standard Section		Test Item	Judgment	Remark
FCC	IC			
15.203		Antenna Requirement	PASS	N/A
15.207	RSS-GEN 7.2.2	Conducted Emission	PASS	N/A
15.205	RSS-Gen 7.2.3	Restricted Bands	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (2)	Hopping Channel Separation	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (4)	Dwell Time	PASS	N/A
15.247(b)(1)	RSS 247 5.4 (2)	Peak Output Power	PASS	N/A
15.247(b)(1)	RSS 247 5.1 (4)	Number of Hopping Frequency	PASS	N/A
15.247(d)	RSS 247 5.5	Band Edge	PASS	N/A
15.247(c)& 15.209	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW: AFSK: 193.7525kHz

Note: N/A is an abbreviation for Not Applicable.

3. Test Equipment

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 18, 2018	Jul. 17, 2019
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 18, 2018	Jul. 17, 2019
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 18, 2018	Jul. 17, 2019
LISN	Rohde & Schwarz	ENV216	101131	Jul. 18, 2018	Jul. 17, 2019
Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 18, 2018	Jul. 17, 2019
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 18, 2018	Jul. 17, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.16, 2018	Mar.15, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar.16, 2018	Mar.15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.16, 2018	Mar.15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.16, 2018	Mar.15, 2019
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 14, 2018	Jul. 13, 2019
Pre-amplifier	Sonoma	310N	185903	Mar.16, 2018	Mar.15, 2019
Pre-amplifier	HP	8449B	3008A00849	Mar.16, 2018	Mar.15, 2019
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.16, 2018	Mar.15, 2019
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 18, 2018	Jul. 17, 2019
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 18, 2018	Jul. 17, 2019
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 15, 2018	Sep. 14, 2019
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 15, 2018	Sep. 14, 2019
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 15, 2018	Sep. 14, 2019
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 15, 2018	Sep. 14, 2019

4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard
FCC Part 15.207

4.1.2 Test Limit

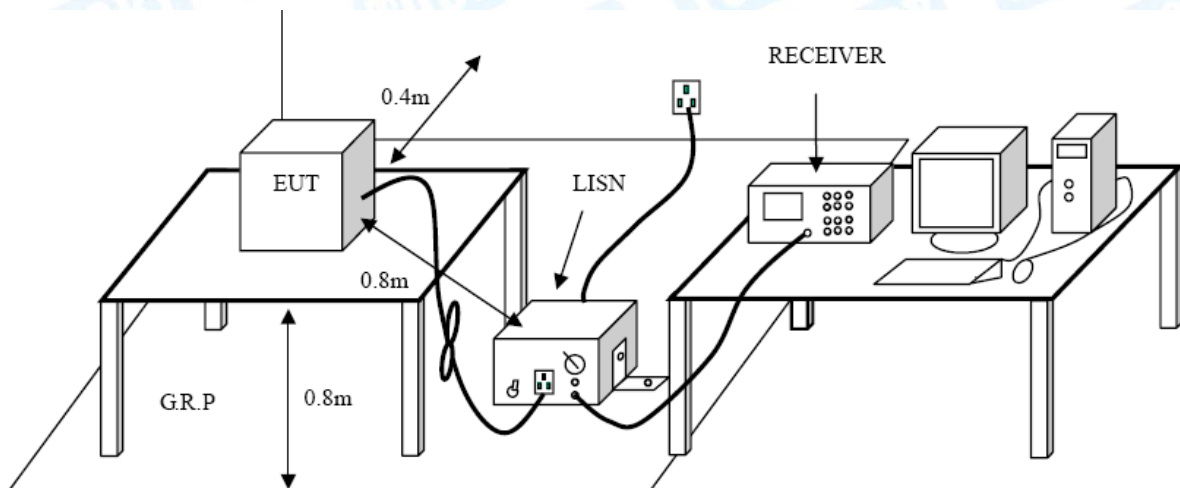
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2 Test Setup



4.3 Test Procedure

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 equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

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.

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.

LISN at least 80 cm from nearest part of EUT chassis

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

Please refer to the Attachment A.

5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 15.209

5.1.2 Test Limit

Radiated Emission Limit (9 kHz~1000MHz)

Frequency (MHz)	Field Strength (microvolt/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
Above 960	500	3

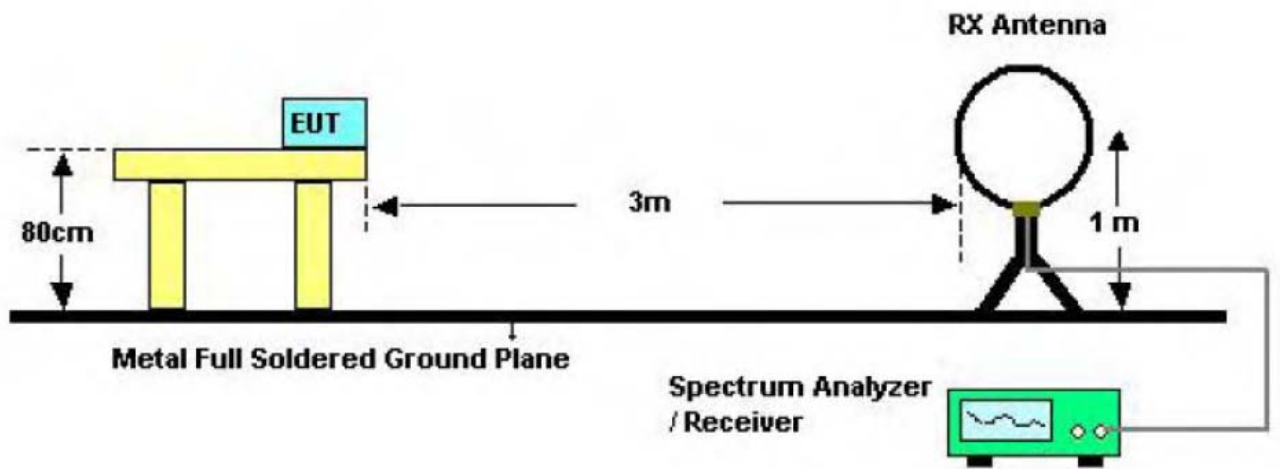
Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Distance of 3m (dBuV/m)	
	Peak	Average
Above 1000	74	54

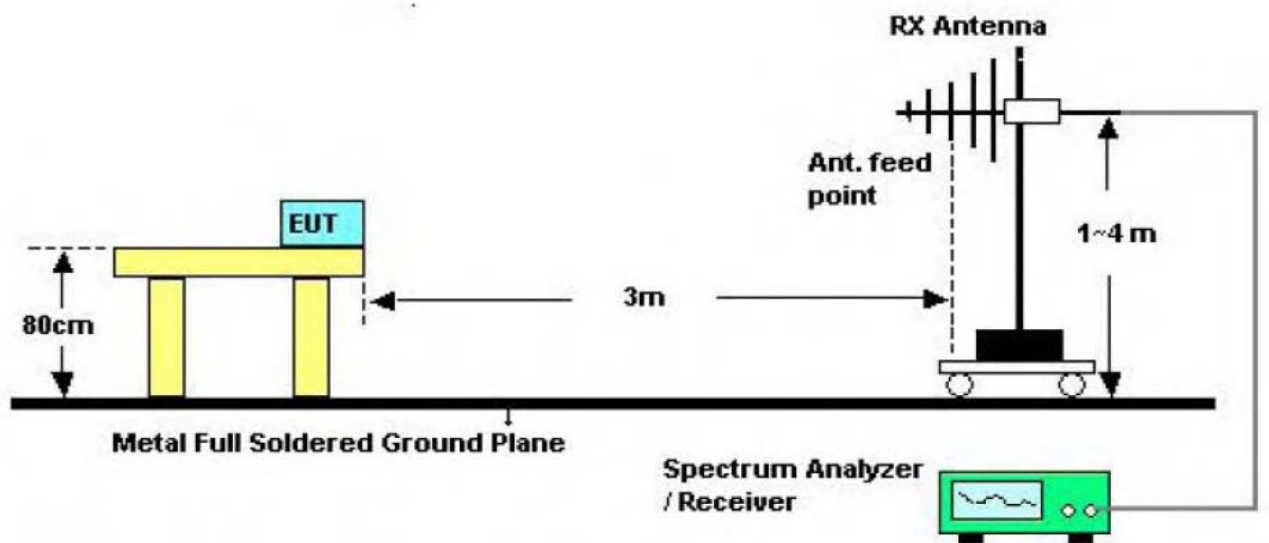
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

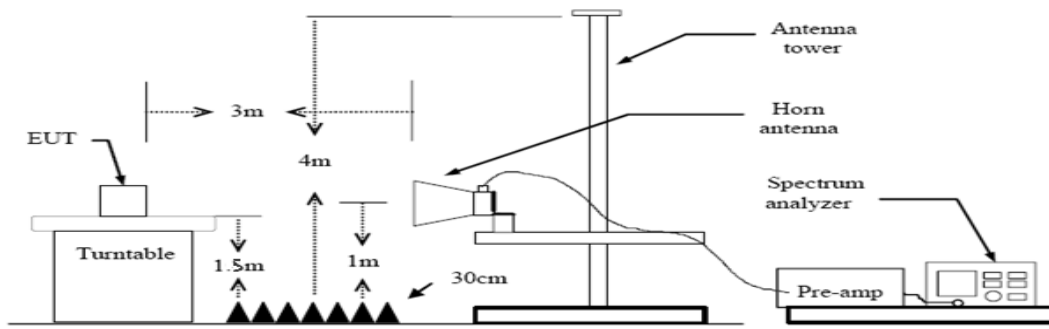
5.2 Test Setup



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.

5.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment B.

6. Restricted Bands Requirement

6.1 Test Standard and Limit

6.1.1 Test Standard

FCC Part 15.209

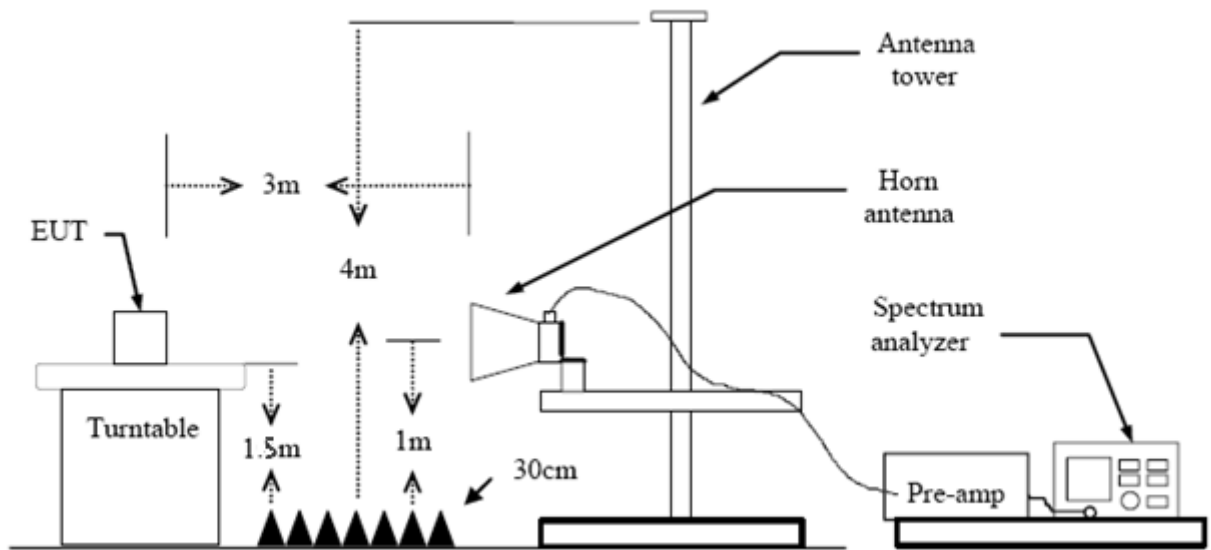
FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency Band (MHz)	Distance of 3m (dBuV/m)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

Note: All restriction bands have been tested, only the worst case is reported.

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with AVG Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

All restriction bands have been tested, only the worst case is reported.

Please refer to the Attachment C.

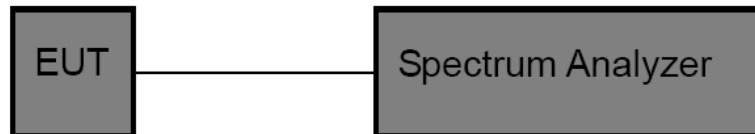
7. Number of Hopping Channel

7.1 Test Standard and Limit

- 6.1.1 Test Standard
FCC Part 15.247 (a)(1)
- 6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

7.2 Test Setup



7.3 Test Procedure

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

7.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

7.5 Test Data

Please refer to the Attachment D.

8. Average Time of Occupancy

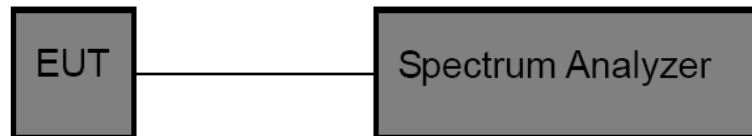
8.1 Test Standard and Limit

8.1.1 Test Standard
FCC Part 15.247 (a)(1)

8.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)	Average Time of Occupancy	0.4 sec

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

8.4 EUT Operating Condition

The average time of occupancy on any channel within the Period can be calculated with formulas:

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / X) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4s * \{\text{Number of Hopping Frequency}\}$$

Note: X=2 or 4 or 6 (1DH1=2, 1DH3=4, 1DH5=6. 2DH1=2, 2DH3=4, 2DH5=6. 3DH1=2, 3DH3=4, 3DH5=6)

The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

The EUT was set to the Hopping Mode by the Customer.

8.5 Test Data

Please refer to the Attachment E.

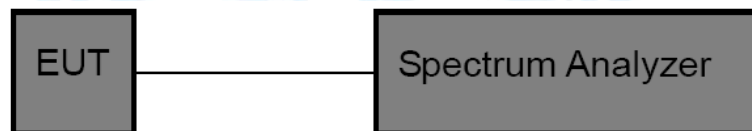
9. Channel Separation and Bandwidth Test

9.1 Test Standard and Limit

- 9.1.1 Test Standard
FCC Part 15.247
- 9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	$\leq 500\text{kHz}$ (20dB bandwidth)	902~928
Channel Separation	$>25\text{kHz}$ or $>$ two-thirds of the 20 dB bandwidth Which is greater	902~928

9.2 Test Setup



9.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Channel Separation: RBW=100 kHz, VBW=100 kHz.
Bandwidth: RBW=30 kHz, VBW=100 kHz.
- (3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

9.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

9.5 Test Data

Please refer to the Attachment F.

10. Peak Output Power Test

10.1 Test Standard and Limit

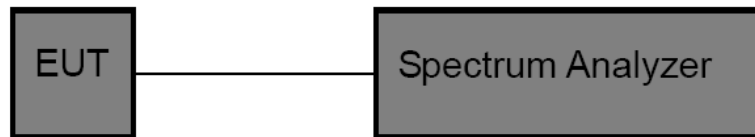
10.1.1 Test Standard

FCC Part 15.247 (b) (1)

10.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125 mW(21dBm)	902~928

10.2 Test Setup



10.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
 Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz.
 RBW=3 MHz, VBW \geq RBW for bandwidth more than 1MHz.

10.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

10.5 Test Data

Please refer to the Attachment G.

11. Antenna Requirement

11.1 Standard Requirement

11.1.1 Standard

FCC Part 15.203

11.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2 Antenna Connected Construction

The gains of the antenna used for transmitting is 8dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

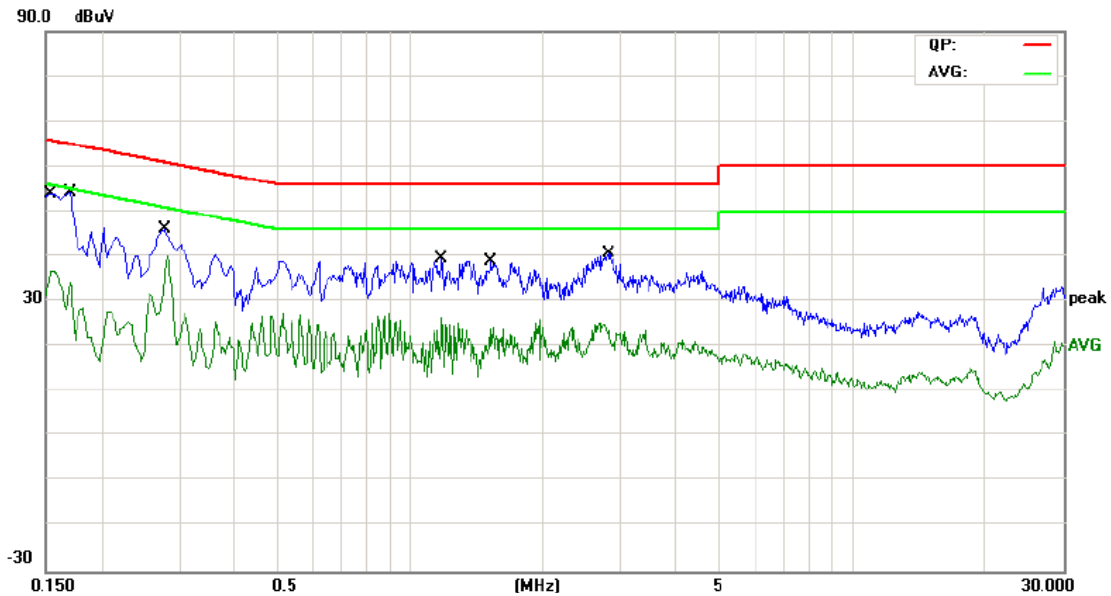
11.3 Result

The EUT antenna is a Detachable Antenna. It complies with the standard requirement.

Antenna Type
<input type="checkbox"/> Permanent attached antenna
<input checked="" type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna

Attachment A-- Conducted Emission Test Data

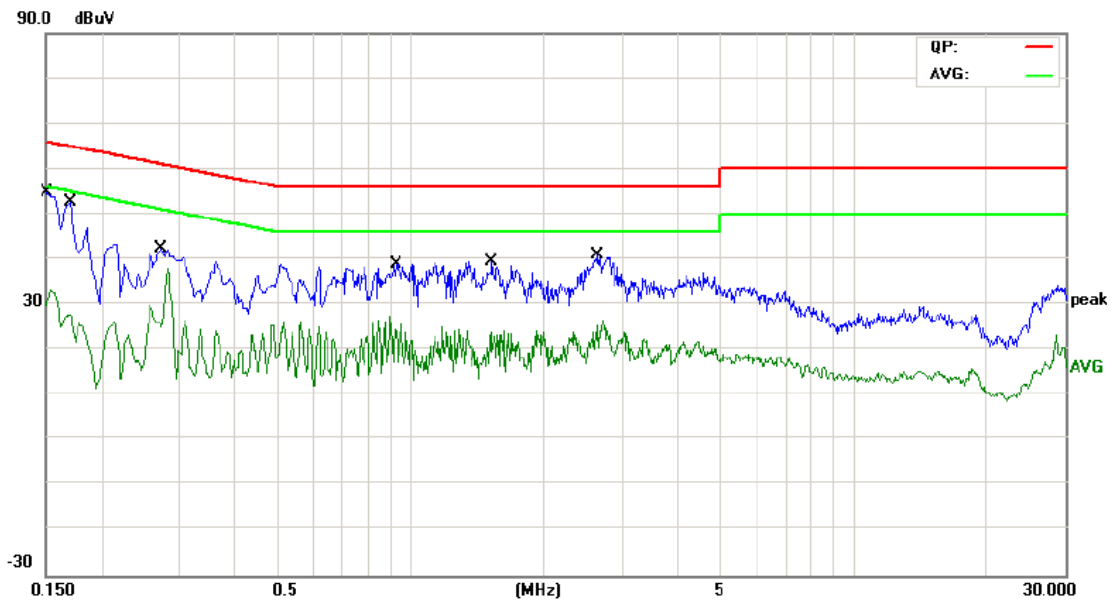
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	TX Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1539	42.21	9.58	51.79	65.78	-13.99	QP
2		0.1539	25.16	9.58	34.74	55.78	-21.04	AVG
3		0.1700	37.17	9.58	46.75	64.96	-18.21	QP
4		0.1700	15.67	9.58	25.25	54.96	-29.71	AVG
5		0.2779	31.40	9.59	40.99	60.88	-19.89	QP
6		0.2779	24.98	9.59	34.57	50.88	-16.31	AVG
7		1.1820	25.10	9.60	34.70	56.00	-21.30	QP
8		1.1820	14.83	9.60	24.43	46.00	-21.57	AVG
9		1.5260	24.61	9.61	34.22	56.00	-21.78	QP
10		1.5260	8.71	9.61	18.32	46.00	-27.68	AVG
11		2.7980	24.34	9.64	33.98	56.00	-22.02	QP
12		2.7980	12.41	9.64	22.05	46.00	-23.95	AVG

Emission Level= Read Level+ Correct Factor

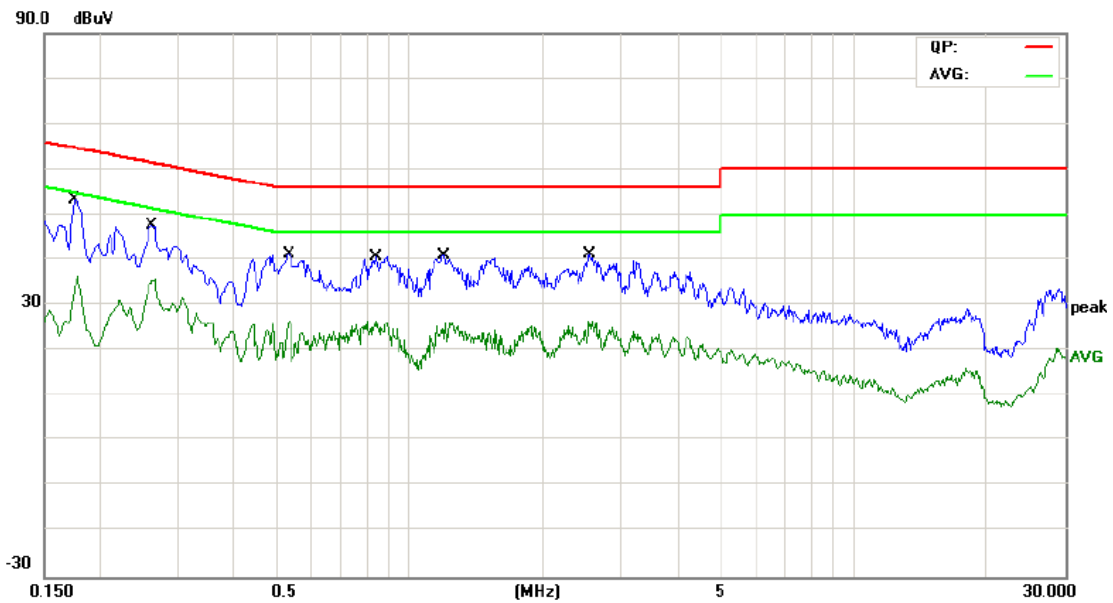
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Neutral		
Test Mode:	TX Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1500	37.72	9.64	47.36	65.99	-18.63	QP
2		0.1500	17.17	9.64	26.81	55.99	-29.18	AVG
3	*	0.1700	37.61	9.64	47.25	64.96	-17.71	QP
4		0.1700	13.41	9.64	23.05	54.96	-31.91	AVG
5		0.2740	28.81	9.59	38.40	60.99	-22.59	QP
6		0.2740	15.46	9.59	25.05	50.99	-25.94	AVG
7		0.9260	25.40	9.59	34.99	56.00	-21.01	QP
8		0.9260	14.88	9.59	24.47	46.00	-21.53	AVG
9		1.5260	24.56	9.60	34.16	56.00	-21.84	QP
10		1.5260	8.63	9.60	18.23	46.00	-27.77	AVG
11		2.6460	24.29	9.65	33.94	56.00	-22.06	QP
12		2.6460	12.88	9.65	22.53	46.00	-23.47	AVG

Emission Level= Read Level+ Correct Factor

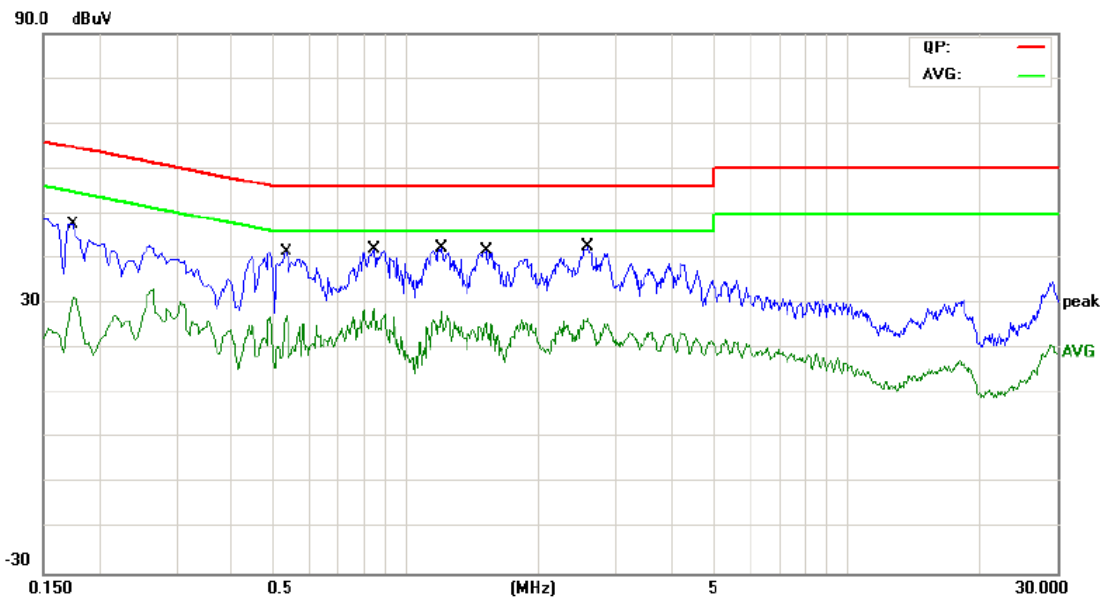
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	AC 240V/60 Hz		
Terminal:	Line		
Test Mode:	TX Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1740	40.69	9.64	50.33	64.76	-14.43	QP
2		0.1740	25.28	9.64	34.92	54.76	-19.84	AVG
3		0.2620	34.83	9.60	44.43	61.36	-16.93	QP
4		0.2620	25.33	9.60	34.93	51.36	-16.43	AVG
5		0.5340	29.83	9.58	39.41	56.00	-16.59	QP
6		0.5340	14.95	9.58	24.53	46.00	-21.47	AVG
7		0.8380	26.96	9.59	36.55	56.00	-19.45	QP
8		0.8380	16.04	9.59	25.63	46.00	-20.37	AVG
9		1.1940	27.43	9.59	37.02	56.00	-18.98	QP
10		1.1940	14.49	9.59	24.08	46.00	-21.92	AVG
11		2.5420	27.51	9.64	37.15	56.00	-18.85	QP
12		2.5420	14.38	9.64	24.02	46.00	-21.98	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	AC 240V/60 Hz		
Terminal:	Neutral		
Test Mode:	TX Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1740	39.42	9.64	49.06	64.76	-15.70	QP
2		0.1740	21.64	9.64	31.28	54.76	-23.48	AVG
3		0.5340	29.72	9.58	39.30	56.00	-16.70	QP
4		0.5340	13.54	9.58	23.12	46.00	-22.88	AVG
5		0.8460	30.11	9.59	39.70	56.00	-16.30	QP
6		0.8460	17.77	9.59	27.36	46.00	-18.64	AVG
7		1.2059	28.10	9.59	37.69	56.00	-18.31	QP
8		1.2059	15.80	9.59	25.39	46.00	-20.61	AVG
9		1.5140	28.97	9.60	38.57	56.00	-17.43	QP
10		1.5140	13.90	9.60	23.50	46.00	-22.50	AVG
11		2.5820	28.50	9.64	38.14	56.00	-17.86	QP
12		2.5820	14.97	9.64	24.61	46.00	-21.39	AVG

Emission Level= Read Level+ Correct Factor

Attachment B-- Radiated Emission Test Data

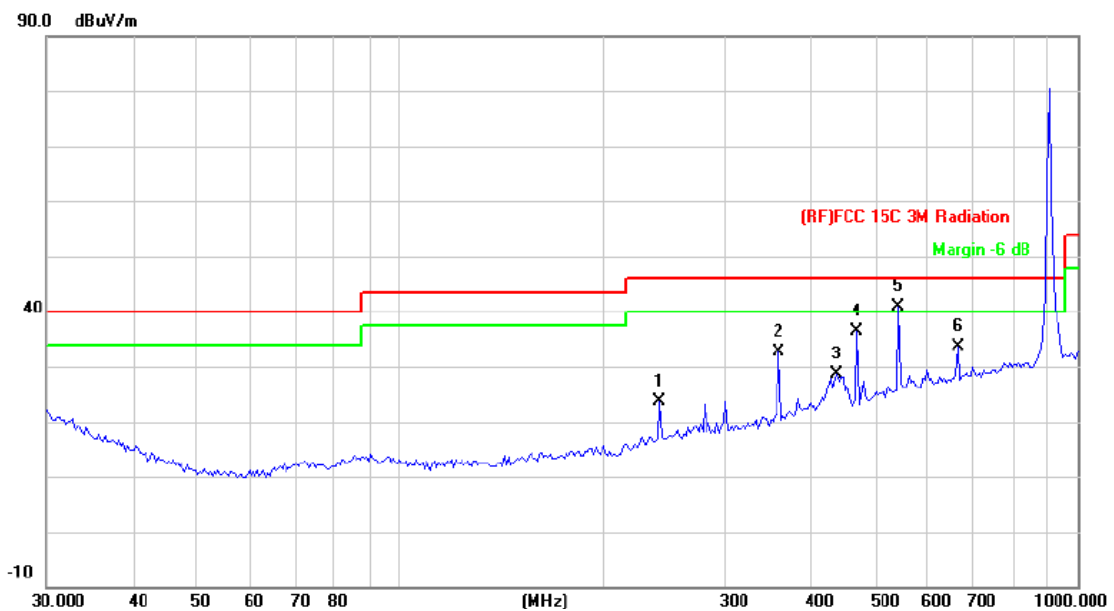
9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz~1GHz

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	Only worse case is reported		

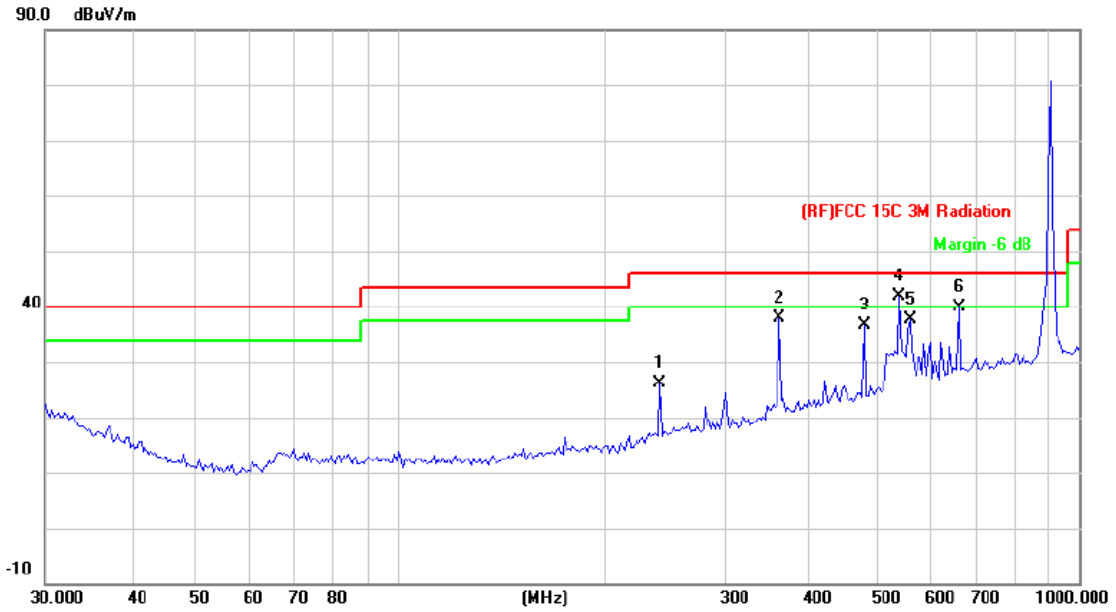


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		240.8304	41.43	-17.69	23.74	46.00	-22.26	QP
2		361.7139	46.69	-14.04	32.65	46.00	-13.35	QP
3		440.1963	40.69	-12.04	28.65	46.00	-17.35	QP
4		472.1760	47.78	-11.38	36.40	46.00	-9.60	QP
5	*	543.2742	50.15	-9.32	40.83	46.00	-5.17	QP
6		665.8035	41.44	-7.71	33.73	46.00	-12.27	QP

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	Only worse case is reported		



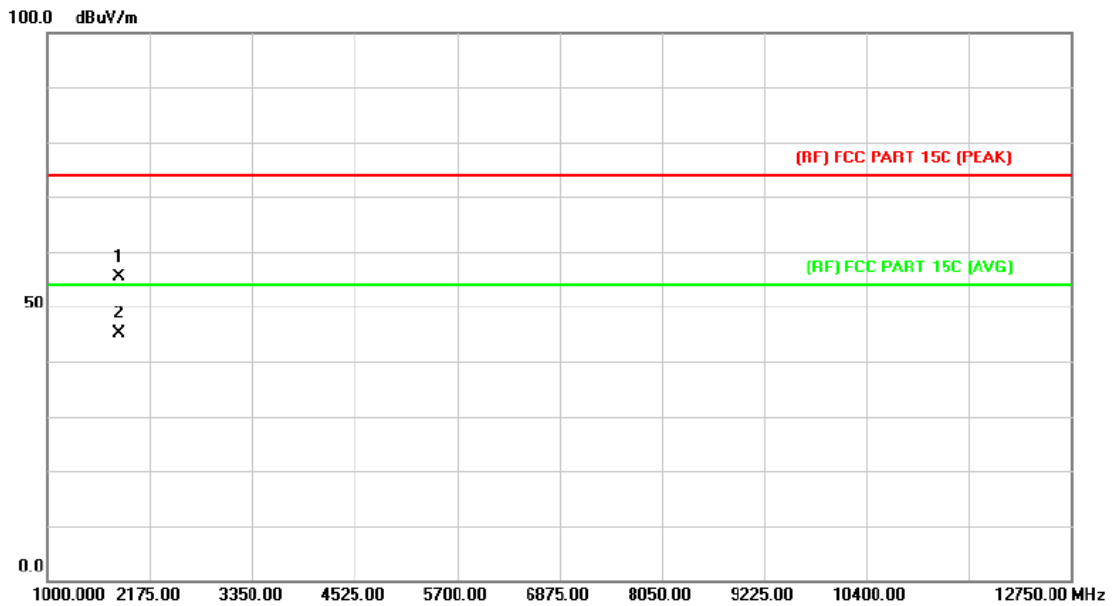
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		240.8304	43.83	-17.69	26.14	46.00	-19.86	QP
2		361.7139	52.00	-14.04	37.96	46.00	-8.04	QP
3		482.2156	47.79	-11.10	36.69	46.00	-9.31	QP
4	*	543.2742	51.26	-9.32	41.94	46.00	-4.06	QP
5		562.6624	46.47	-8.96	37.51	46.00	-8.49	QP
6		665.8035	47.71	-7.71	40.00	46.00	-6.00	QP

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

Above 1GHz(Only worse case is reported)

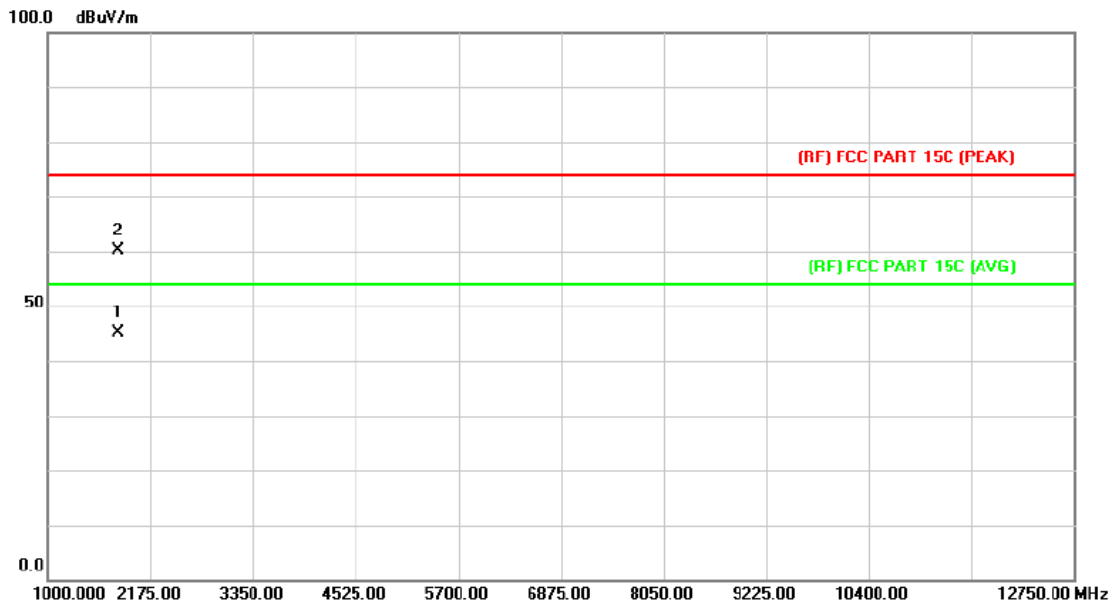
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Horizontal		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1805.478	56.82	14.43	55.45	74.00	-18.55	peak
2	*	1805.574	46.62	14.43	45.25	54.00	-8.75	AVG

Emission Level= Read Level+ Correct Factor

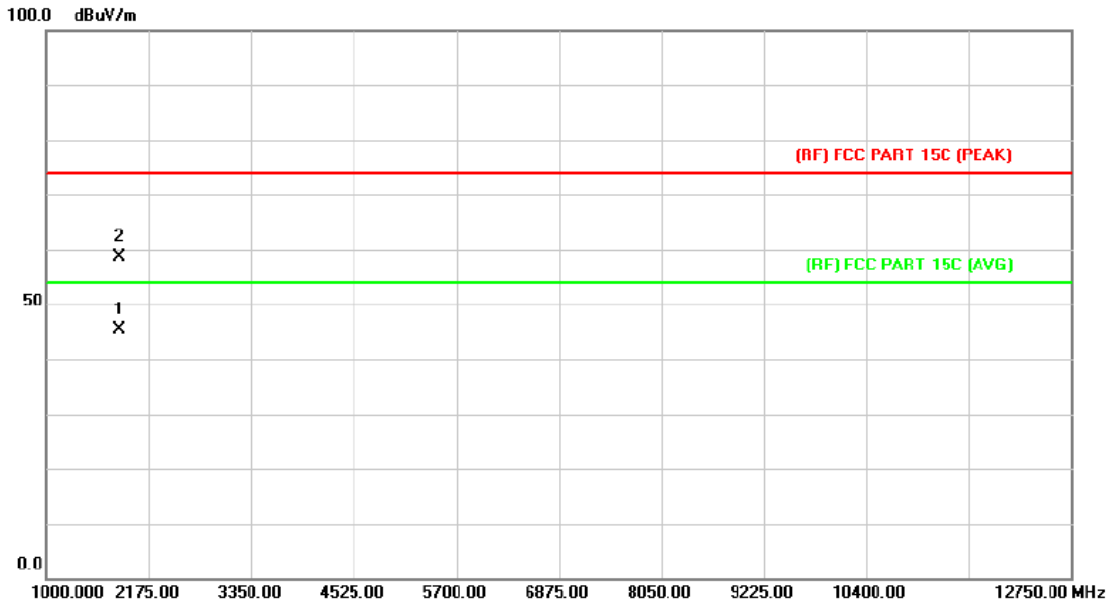
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Vertical		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	1805.036	46.63	14.43	45.21	54.00	-8.79	AVG
2		1805.125	61.57	14.43	60.15	74.00	-13.85	peak

Emission Level= Read Level+ Correct Factor

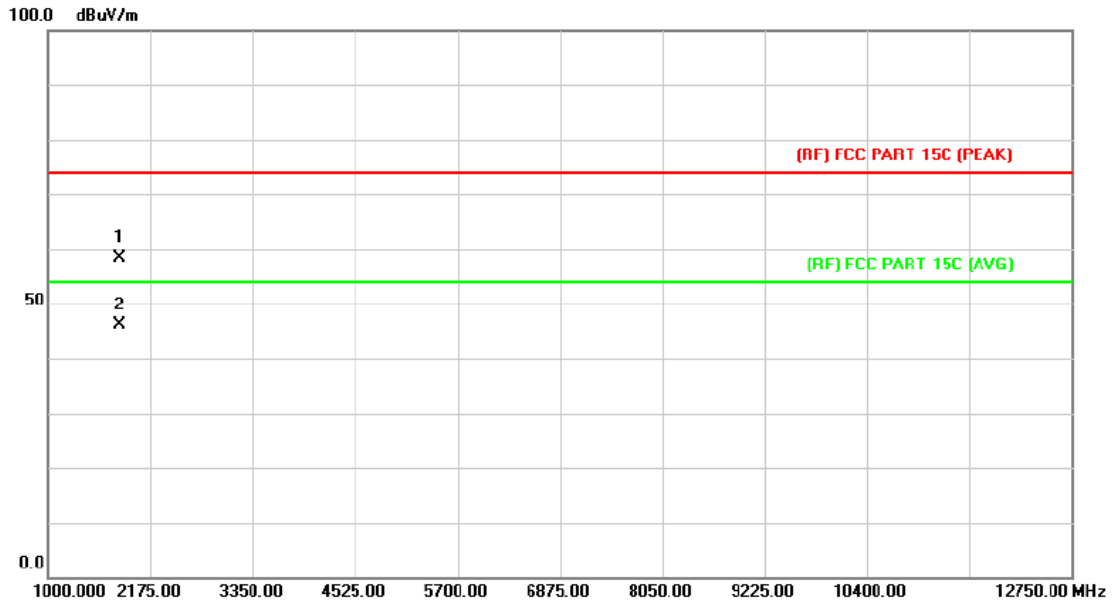
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Horizontal		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	1830.456	46.62	14.43	45.47	54.00	-8.53	AVG
2		1830.562	59.86	14.43	58.71	74.00	-15.29	peak

Emission Level= Read Level+ Correct Factor

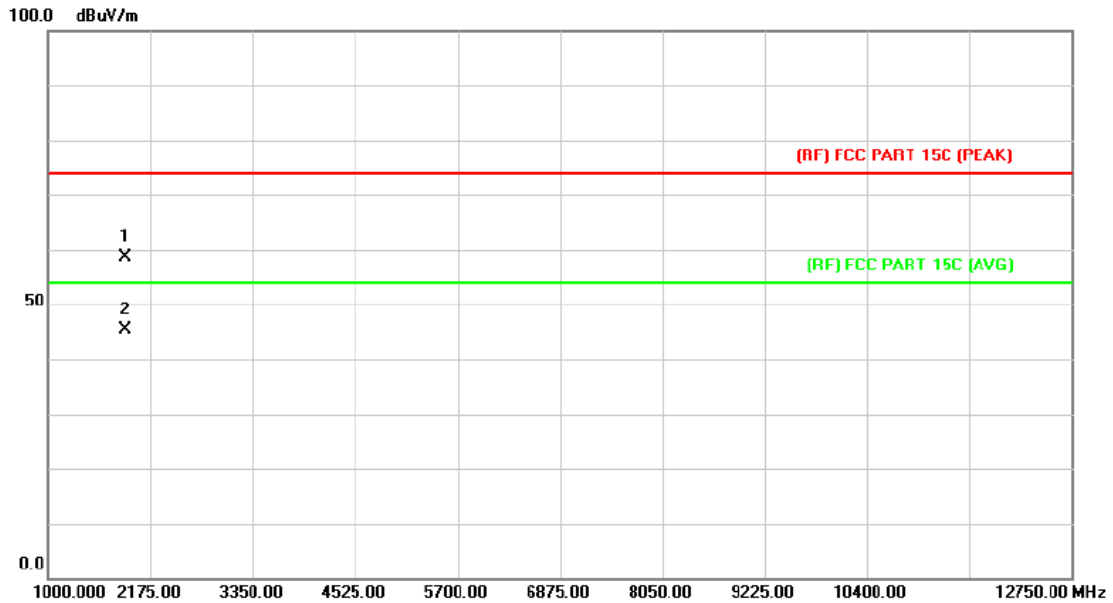
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Vertical		
Test Mode:	TX AFSK Mode 915MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1830.144	59.70	14.43	58.47	74.00	-15.53	peak
2	*	1830.414	47.48	14.43	46.25	54.00	-7.75	AVG

Emission Level= Read Level+ Correct Factor

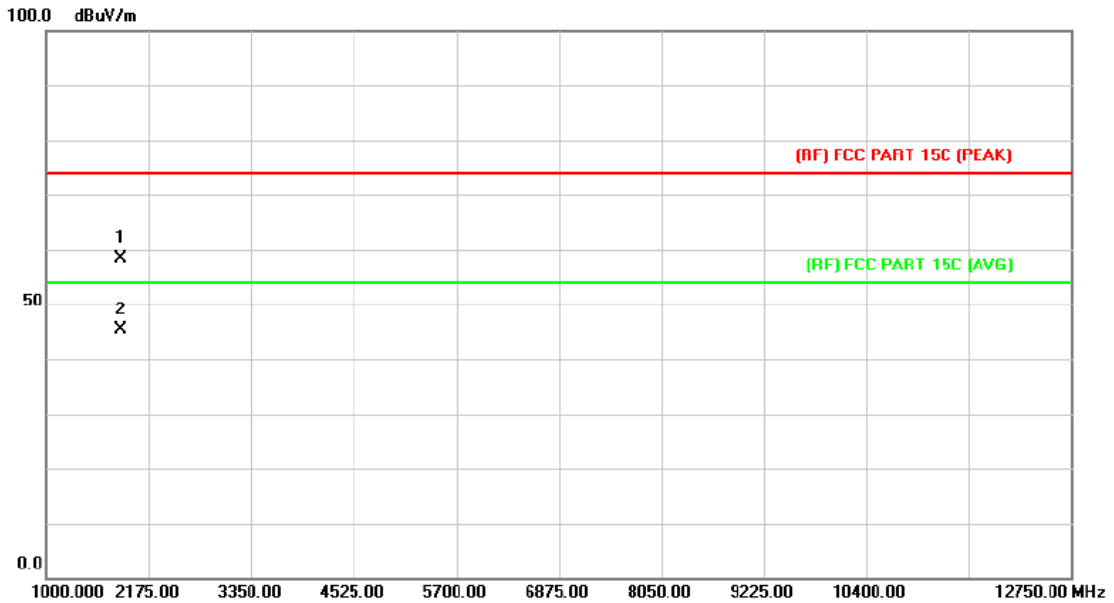
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Horizontal		
Test Mode:	TX AFSK Mode 927MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1854.354	59.20	14.43	58.52	74.00	-15.48	peak
2	*	1854.356	46.04	14.43	45.36	54.00	-8.64	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Vertical		
Test Mode:	TX AFSK Mode 927MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



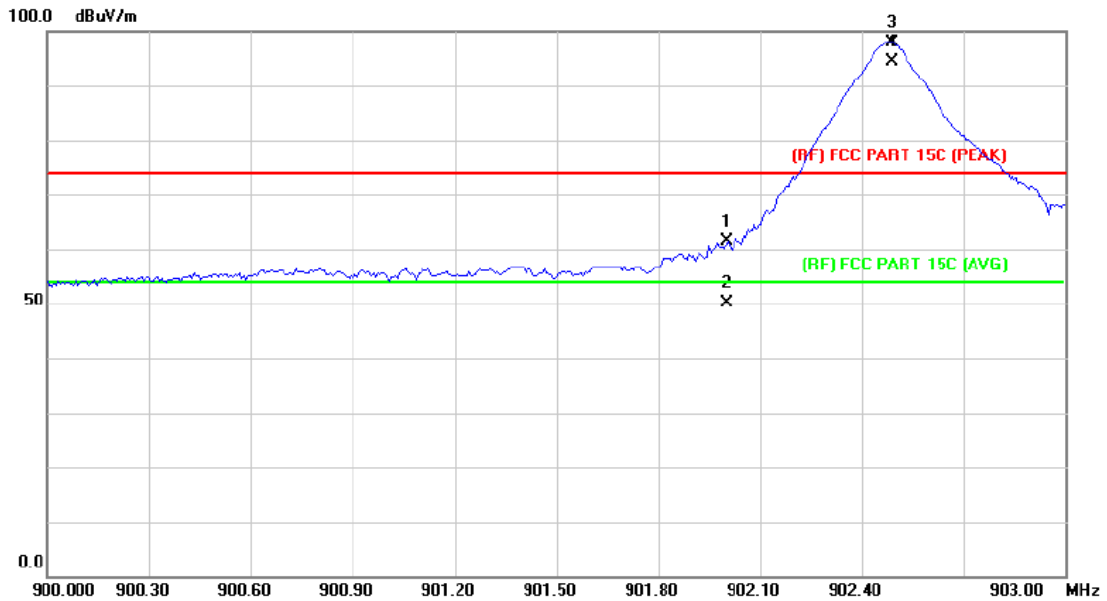
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		1854.247	59.40	14.43	58.39	74.00	-15.61	peak
2	*	1854.748	46.36	14.43	45.35	54.00	-8.65	AVG

Emission Level= Read Level+ Correct Factor

Attachment C-- Restricted Bands Requirement Test Data

(1) Radiation Test

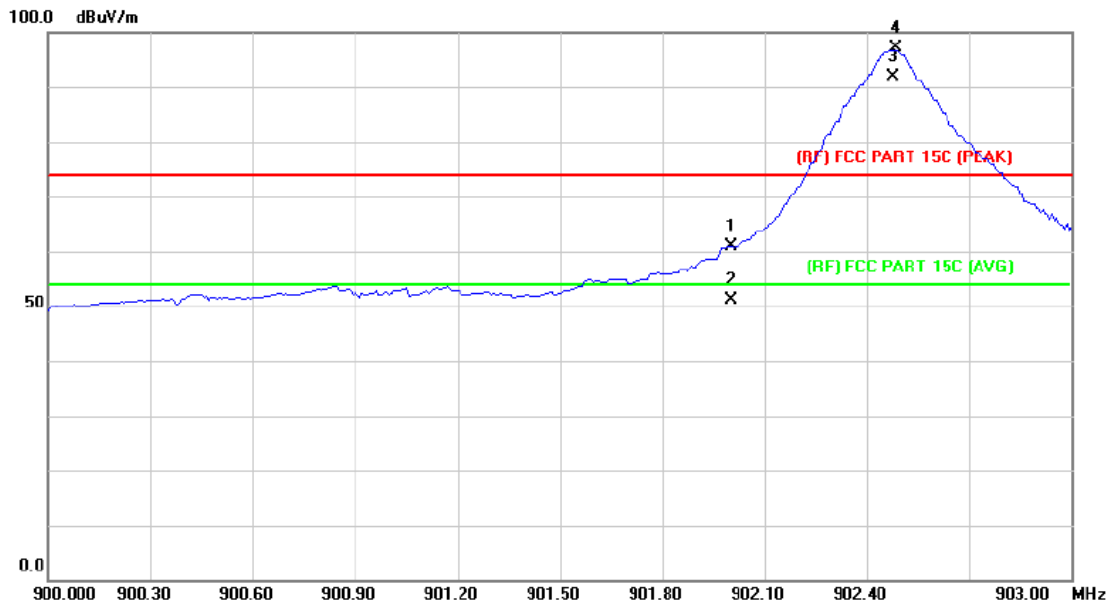
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Horizontal		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		902.0000	64.94	-3.60	61.34	74.00	-12.66	peak
2		902.0000	53.71	-3.60	50.11	54.00	-3.89	AVG
3	X	902.4900	101.46	-3.60	97.86	Fundamental Frequency		peak
4	*	902.4900	97.97	-3.60	94.37	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

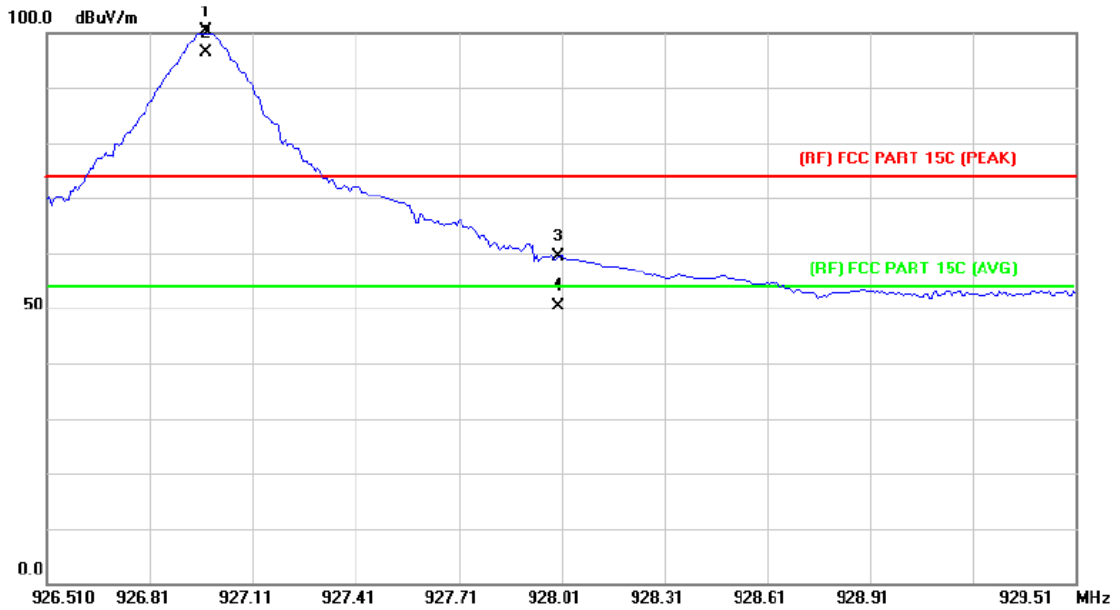
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Vertical		
Test Mode:	TX AFSK Mode 902.5MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		902.0000	64.37	-3.60	60.77	74.00	-13.23	peak
2		902.0000	54.63	-3.60	51.03	54.00	-2.97	AVG
3	X	902.4779	95.48	-3.60	91.88	Fundamental Frequency		AVG
4	*	902.4840	100.73	-3.60	97.13	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

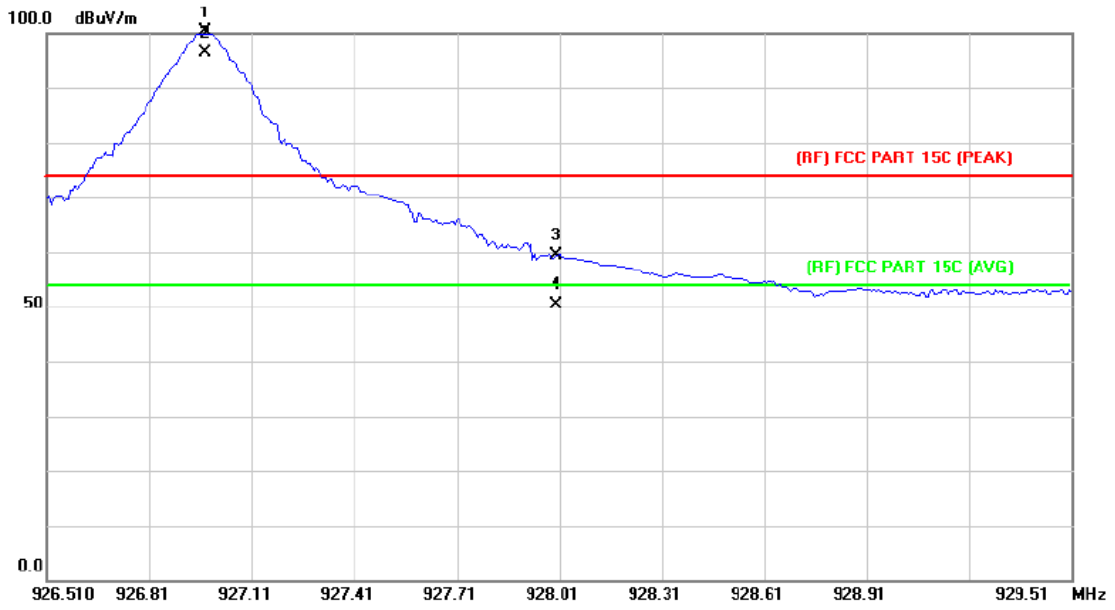
Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Horizontal		
Test Mode:	TX AFSK Mode 927 MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	926.9780	99.36	-3.59	95.77	Fundamental Frequency		peak
2	*	926.9780	94.87	-3.59	91.28	Fundamental Frequency		AVG
3		928.0000	61.06	-3.60	57.46	74.00	-16.54	peak
4		928.0000	52.82	-3.60	49.22	54.00	-4.78	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Ant. Pol.	Vertical		
Test Mode:	TX AFSK Mode 927 MHz		
Remark:	Only worse case is reported		



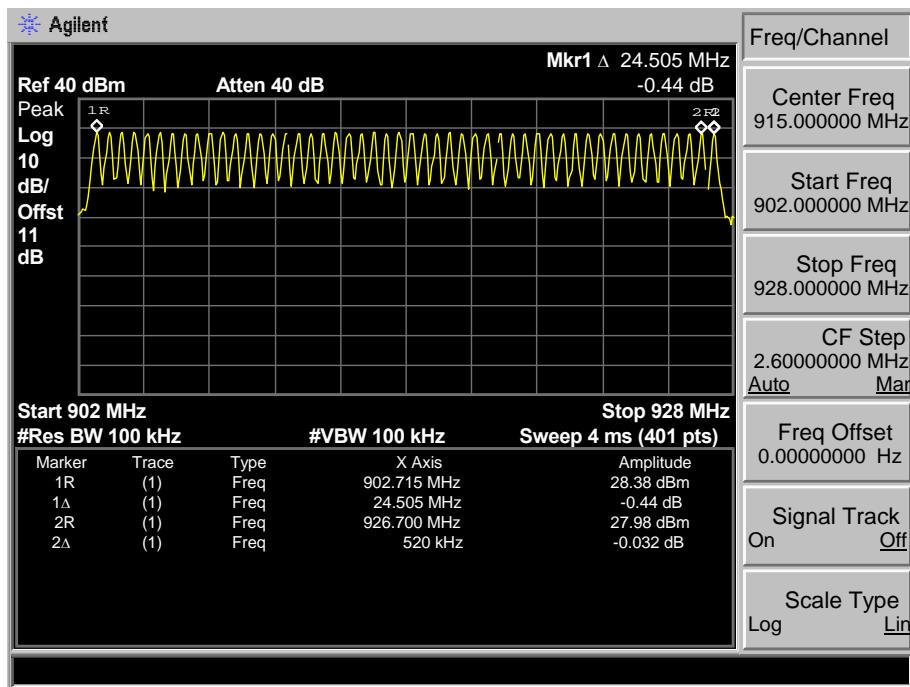
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	926.9778	103.86	-3.59	100.27	Fundamental Frequency		peak
2	*	926.9778	100.03	-3.59	96.44	Fundamental Frequency		AVG
3		928.0000	63.06	-3.60	59.46	74.00	-14.54	peak
4		928.0000	53.97	-3.60	50.37	54.00	-3.63	AVG

Emission Level= Read Level+ Correct Factor

Attachment D-- Number of Hopping Channel Test Data

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Test Mode:	Hopping Mode		
Frequency Range	Test Mode	Quantity of Hopping Channel	Limit
902.5MHz~927MHz	AFSK	50	>15

AFSK Mode



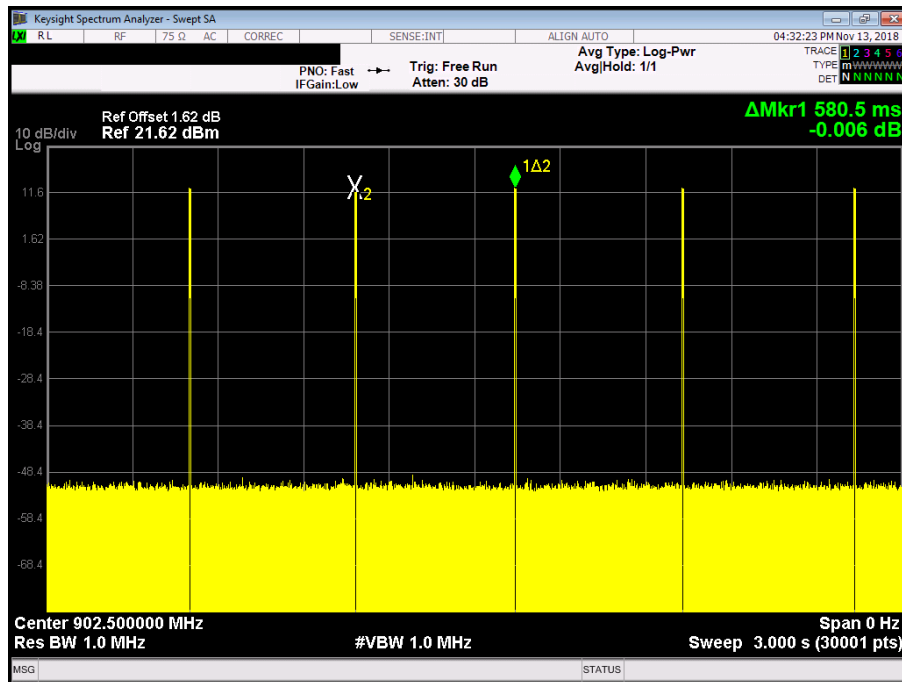
Attachment E-- Average Time of Occupancy Test Data

Temperature: 25°C		Relative Humidity: 55%			
Test Voltage: DC 9V					
Test Mode: Hopping Mode (AFSK)					
Test Mode	Interval Time(ms)	Pulse Time (ms)	Total of Dwell (ms)	Limit (ms)	Result
Hopping	580.5	7.413	247.1	400	PASS

Dwell time=Ton* \sum Ton times in 1s*0.4s*Channel numbers=7.413*(5/3)*0.4*50

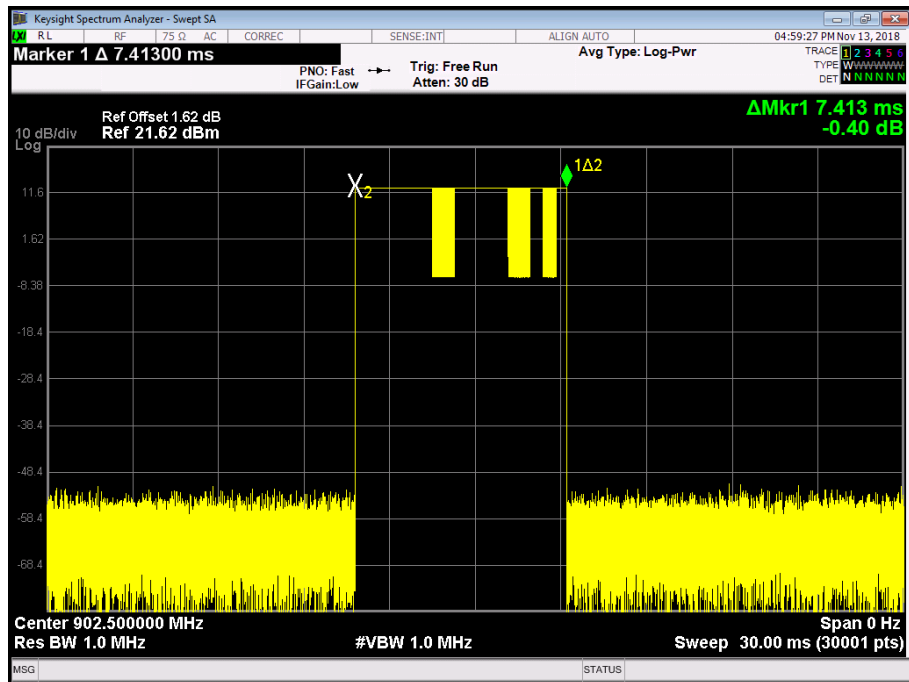
AFSK Hopping Mode 1DH1

915 MHz



AFSK Hopping Mode 1DH3

915 MHz

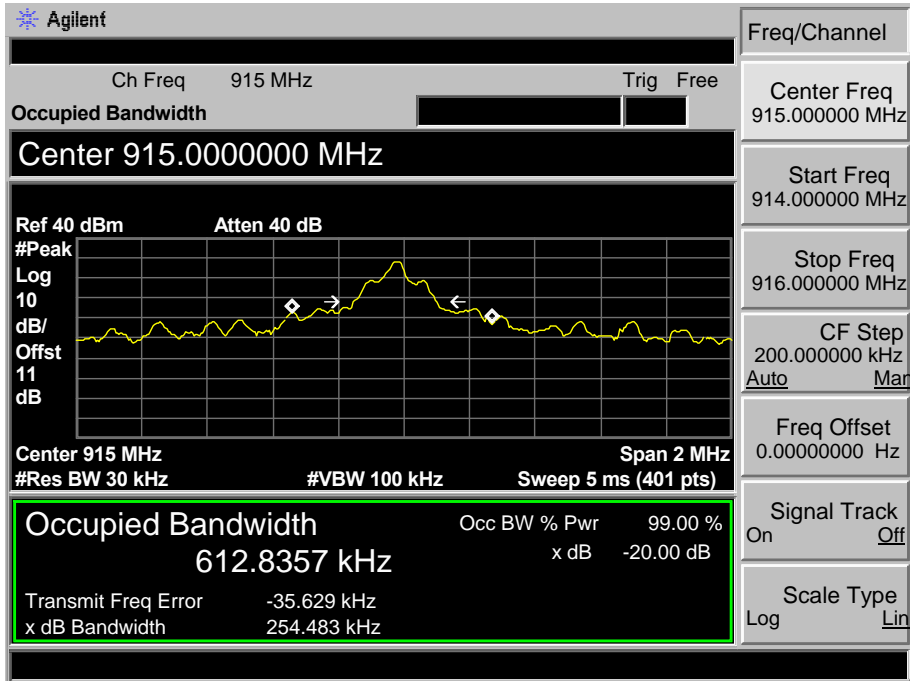


Attachment F-- Channel Separation and Bandwidth Test Data

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Test Mode:	TX Mode (AFSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
902.5	617.3884	249.937	
915	612.8357	254.483	
927	603.4961	251.708	
AFSK TX Mode			
902.5 MHz			

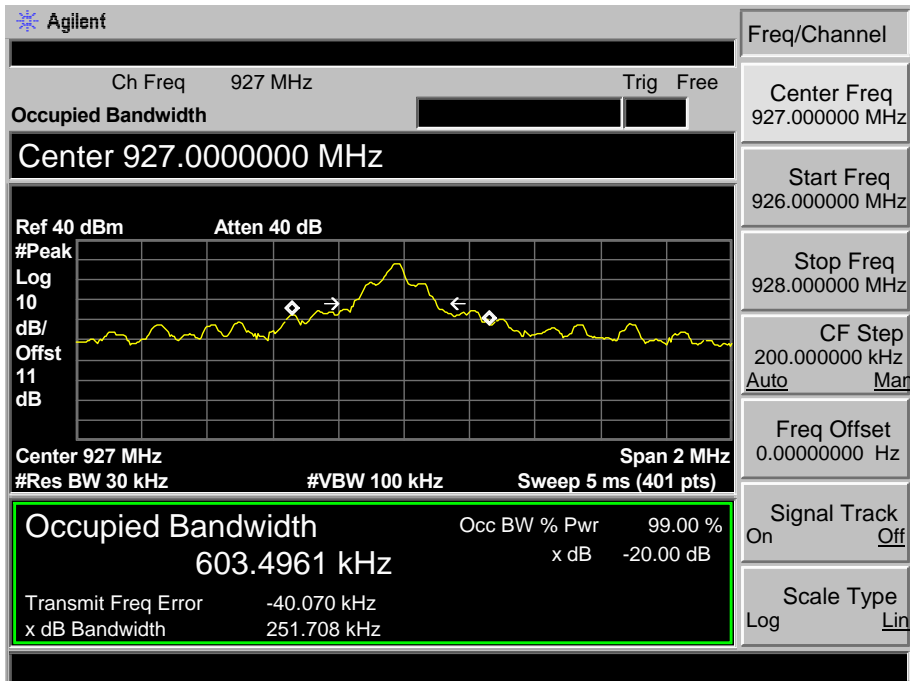
AFSK TX Mode

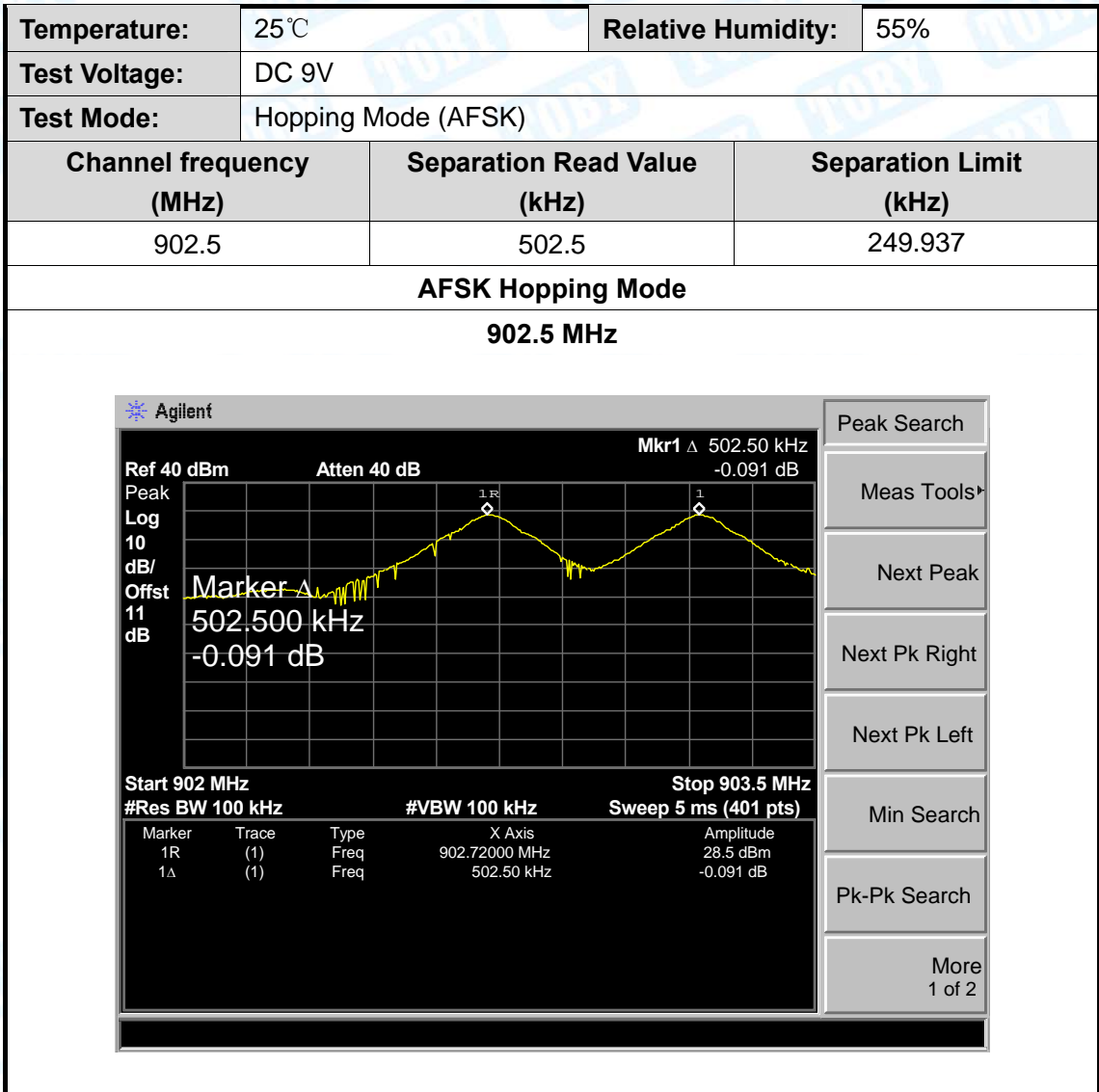
915 MHz



AFSK TX Mode

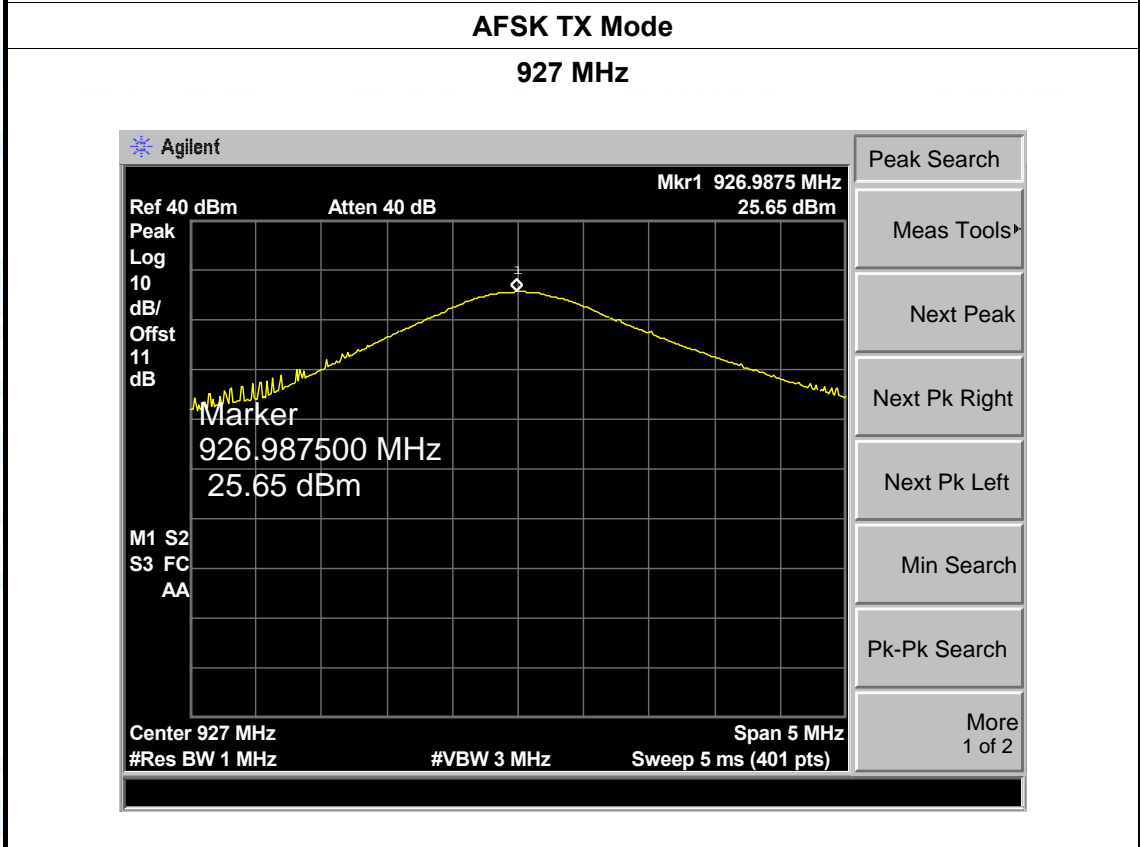
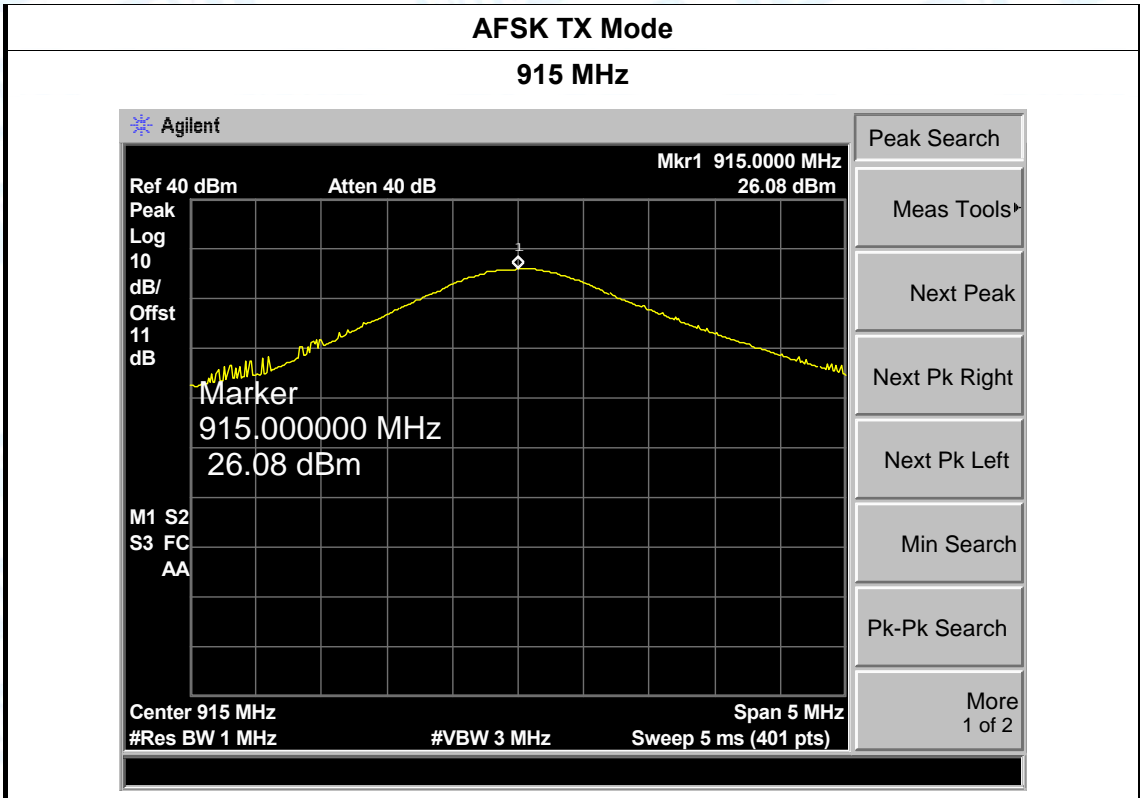
927 MHz





Attachment G-- Peak Output Power Test Data

Temperature:	25°C	Relative Humidity:	55%
Test Voltage:	DC 9V		
Test Mode:	TX Mode (AFSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
902.5	26.48	28	
915	26.08		
927	25.65		
AFSK TX Mode			
902.5 MHz			
<p>The screenshot shows an Agilent spectrum analyzer interface. The main display area shows a yellow trace with a peak at 902.550000 MHz and 26.48 dBm. The interface includes a grid, a peak search tool, and various measurement and search options on the right side. The top of the screen shows 'Agilent' and 'Mkr1 902.5500 MHz 26.48 dBm'. The bottom of the screen shows 'Center 902.5 MHz', 'Span 5 MHz', '#Res BW 1 MHz', '#VBW 3 MHz', and 'Sweep 5 ms (401 pts)'. The right side of the screen has a vertical toolbar with buttons for 'Peak Search', 'Meas Tools', 'Next Peak', 'Next Pk Right', 'Next Pk Left', 'Min Search', 'Pk-Pk Search', and 'More 1 of 2'.</p>			



-----END OF REPORT-----