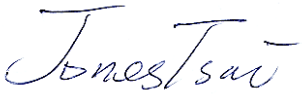
FCC RF Test Report

APPLICANT	:	**Zebra Technologies Corporation**
EQUIPMENT	:	**RFID Sled**
BRAND NAME	:	**Zebra**
MODEL NAME	:	**RFD2000**
FCC ID	:	**UZ7RFD2000**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DSS) Spread Spectrum Transmitter**

The product was received on Aug. 29, 2017 and testing was completed on Oct. 15, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR782919	Rev. 01	Initial issue of report	Oct. 20, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	Number of Channels	≥ 25Chs	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	≥ 20dB BW	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	≤ 0.4sec in 20sec period	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	NA	Pass	-
3.4	-	99% Bandwidth	-	Pass	-
3.5	15.247(b)(1)	Output Power	≤ 1 W	Pass	-
3.6	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	≤ 20dBc	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.49 dB at 6490.000 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not required.	-
3.9	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-
Note: Not required means after assessing, test items are not necessary to carry out.					

1 .General Description

1.1 Applicant

Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742-1300, USA

1.2 Manufacturer

Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742-1300, USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	RFID Sled
Brand Name	Zebra
Model Name	RFD2000
FCC ID	UZ7RFD2000
EUT supports Radios application	UHF RFID
HW Version	DV1
SW Version	RFID Manager Application Version: 1.0.7.15 RFID Demo. Application Version: 1.0.5.8 Terminal version : 01-08-08-0-NN-00-M1
FW Version	Module Version: PAADXS00-001-N12 Radio Version: 2.0.14.0
MFD	28AUG17
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Specification of Accessories				
Battery	**Brand Name**	Zebra	**Part Number**	82-166537-01

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	902.75 MHz ~ 927.25 MHz
Number of Channels	50
Maximum Output Power to Antenna	29.78 dBm (0.9506 W)
20dB Bandwidth	0.338 MHz
99% Occupied Bandwidth	0.334 MHz
Antenna Type / Gain	PCB Antenna with gain 2.2 dBic
Type of Modulation	ASK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH05-HY	03CH07-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
902.75-927.25 MHz	0	902.75	27	916.25
	1	903.25	28	916.75
	2	903.75	29	917.25
	3	904.25	30	917.75
	4	904.75	31	918.25
	5	905.25	32	918.75
	6	905.75	33	919.25
	7	906.25	34	919.75
	8	906.75	35	920.25
	9	907.25	36	920.75
	10	907.75	37	921.25
	11	908.25	38	921.75
	12	908.75	39	922.25
	13	909.25	40	922.75
	14	909.75	41	923.25
	15	910.25	42	923.75
	16	910.75	43	924.25
	17	911.25	44	924.75
	18	911.75	45	925.25
	19	912.25	46	925.75
	20	912.75	47	926.25
	21	913.25	48	926.75
	22	913.75	49	927.25
	23	914.25		
	24	914.75		
	25	915.25		
	26	915.75		

2.2 Test Mode

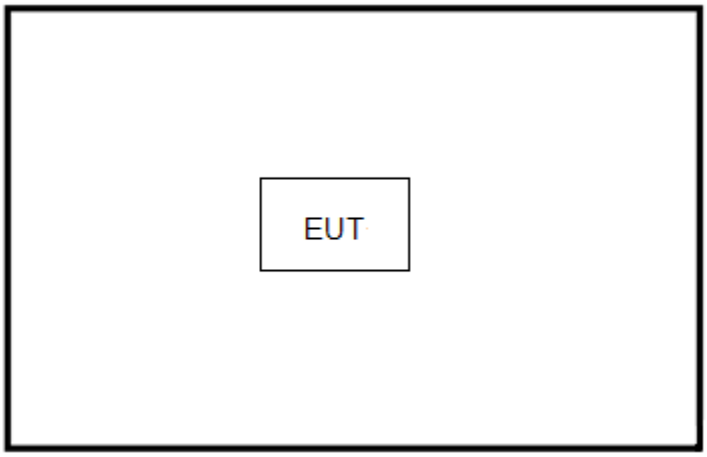
a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated:, radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower)

b. Pre-scanned tests, X, Y, Z in three orthogonal panels, and different data rates were conducted to determine the final configuration (Z plane as worst plane) from all possible combinations, and recorded in this report.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Conducted Test Cases	**UHF RFID 902.75MHz~927.25MHz**
	Mode 1: CH00_902.75 MHz Mode 2: CH24_914.75 MHz Mode 3: CH49_927.25 MHz
Radiated Test Cases	**UHF RFID 902.75MHz~927.25MHz**
	Mode 1: CH00_902.75 MHz Mode 2: CH24_914.75 MHz Mode 3: CH49_927.25 MHz

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

The RF test items, an engineering test program “Regulatory Test” was provided and enabled to make EUT transmitting signals.

2.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 902.75-927.25 MHz band shall use at least 25 channels.

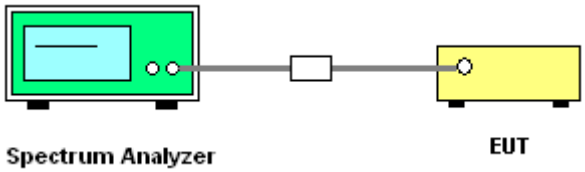
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW = 300kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

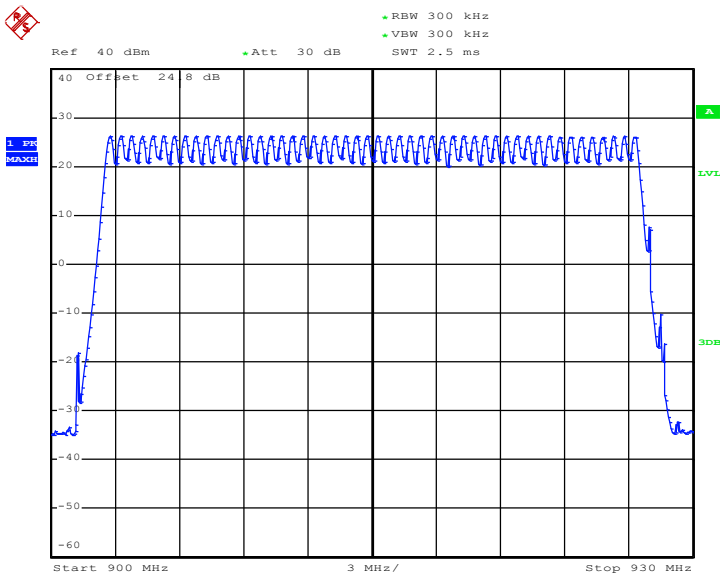
3.1.4 Test Setup



3.1.5 Test Result of Number of Hopping Frequency

Number of Hopping (Channel)	Limits (Channel)	Pass/Fail
50	> 25	Pass

Number of Hopping Channel Plot on Channel 00 - 49



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3.2 Hopping Channel Separation Measurement

3.2.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 902.75-927.25 MHz band may have hopping channel carrier frequencies that are 20 dB bandwidth of the hopping channel, whichever is greater.

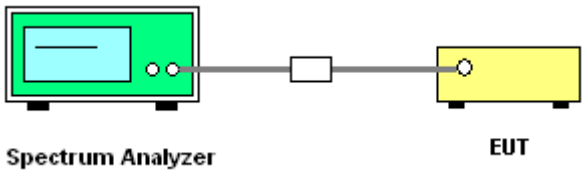
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels;
   RBW = 300kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

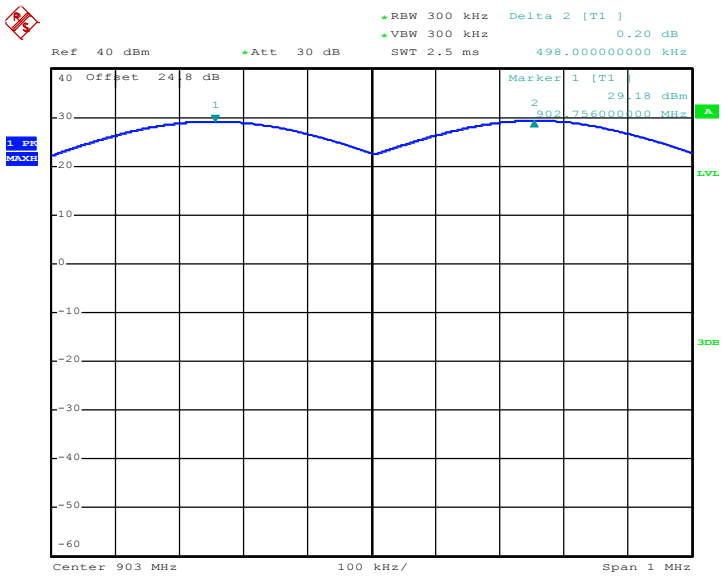
3.2.4 Test Setup



3.2.5 Test Result of Hopping Channel Separation

Mod.	NTX	CH.	Freq. (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
UHF RFID	1	0	902.75	0.498	0.3300	Pass
UHF RFID	1	24	914.75	0.502	0.3320	Pass
UHF RFID	1	49	927.25	0.496	0.3380	Pass

Channel Separation Plot on Channel 00 - 01



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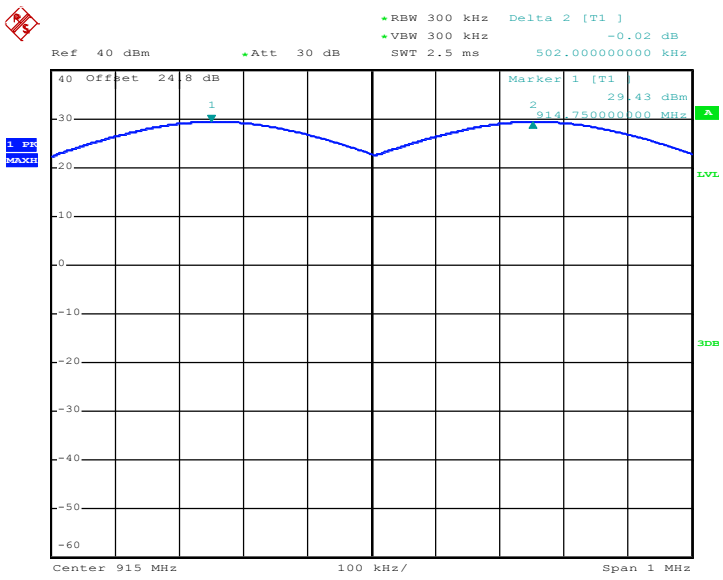
Channel Separation Plot on Channel 24 - 25



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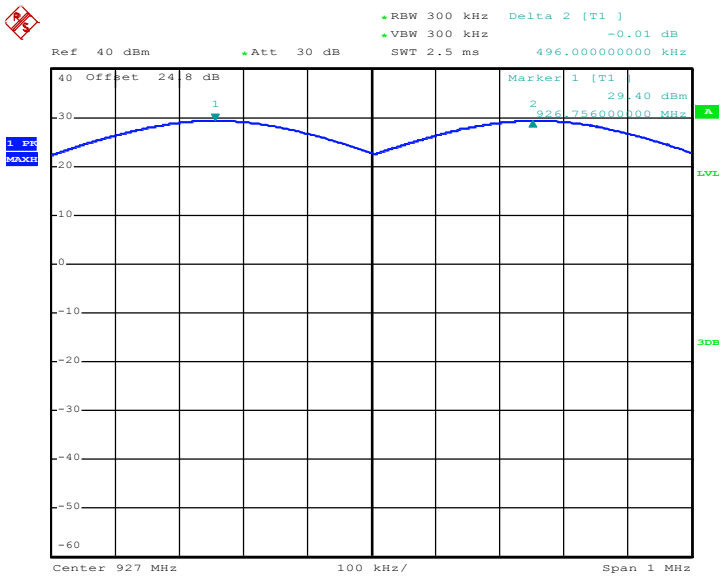
Channel Separation Plot on Channel 48 - 49



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3.3 Dwell Time Measurement

3.3.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 20 seconds multiplied by the number of hopping channels employed.

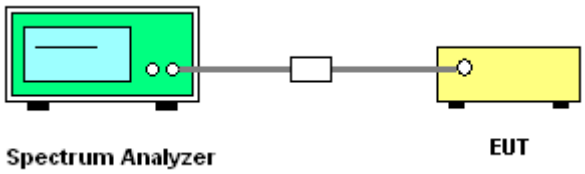
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

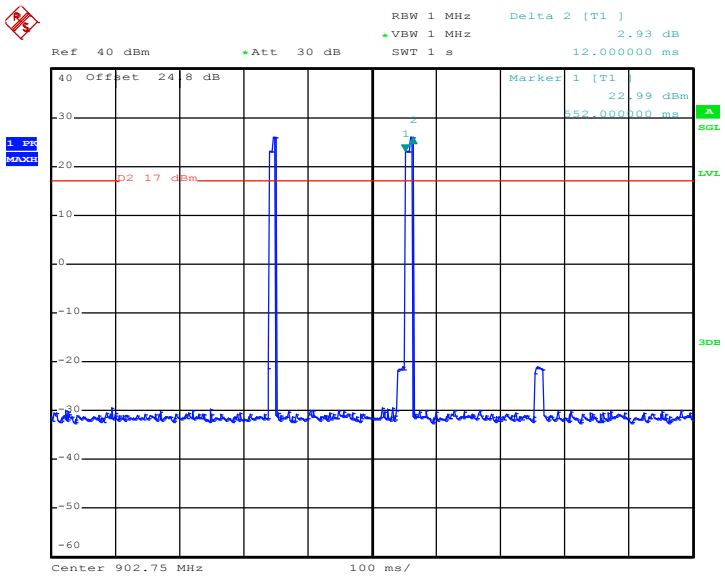
3.3.4 Test Setup



3.3.5 Test Result of Dwell Time

Mod.	Channel Number Rate	Package Transfer Time (msec	Hops Over Occupancy Time(hops)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Nomal	50	12	2.00	0.02	0.4	Pass

Package Transfer Time Plot



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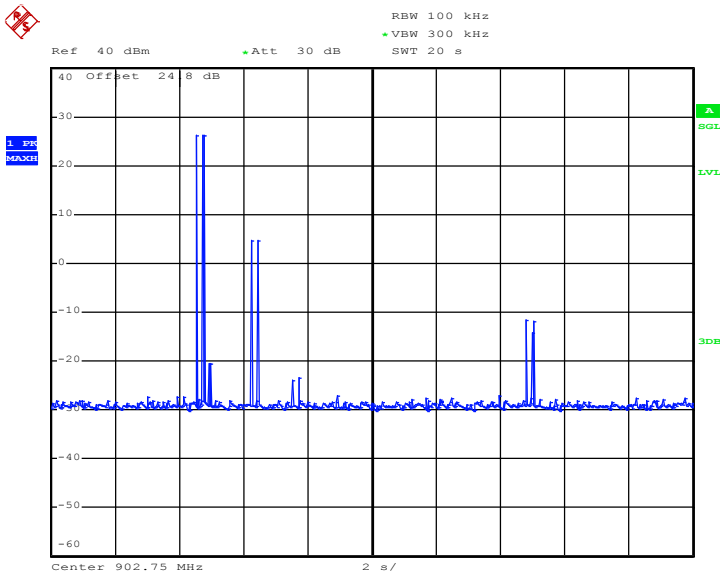

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Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB and 99% Bandwidth

Reporting only

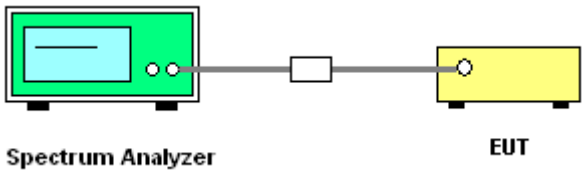
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
   Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;
   RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
   Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;
   RBW ≥ 1% of the 99% bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
6. Measure and record the results in the test report.

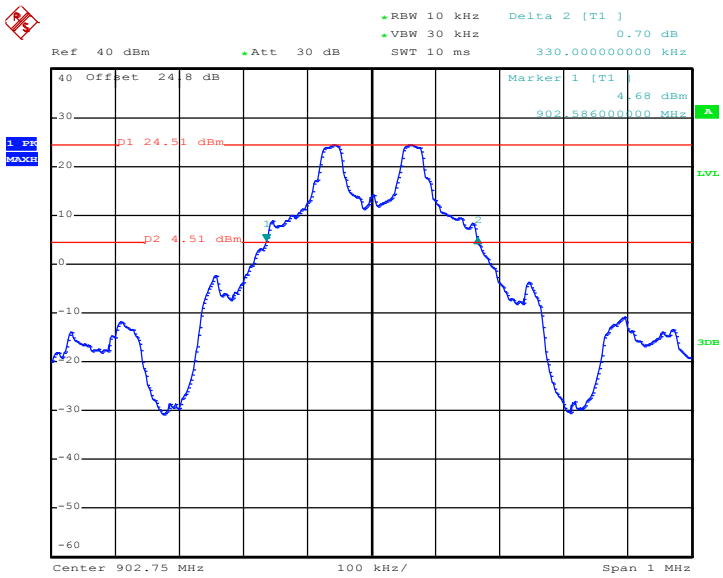
3.4.4 Test Setup



3.4.5 Test Result of 20dB Bandwidth

Mod.	NTX	CH.	Freq. (MHz)	20db BW (MHz)	Pass/Fail
UHF RFID	1	0	902.75	0.330	Pass
UHF RFID	1	24	914.75	0.332	Pass
UHF RFID	1	49	927.25	0.338	Pass

20 dB Bandwidth Plot on Channel 00



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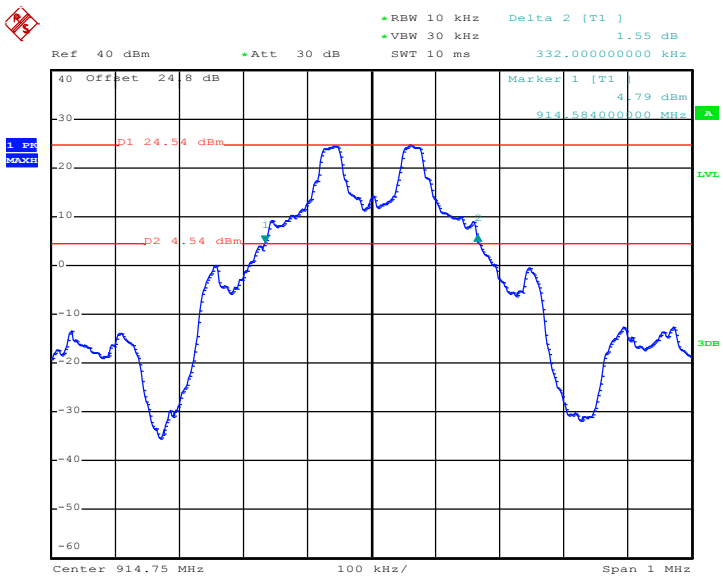
20 dB Bandwidth Plot on Channel 24



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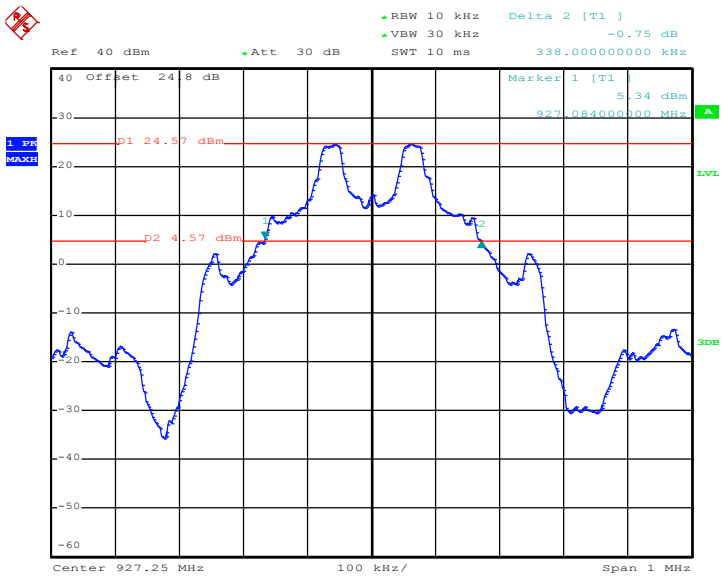
20 dB Bandwidth Plot on Channel 49



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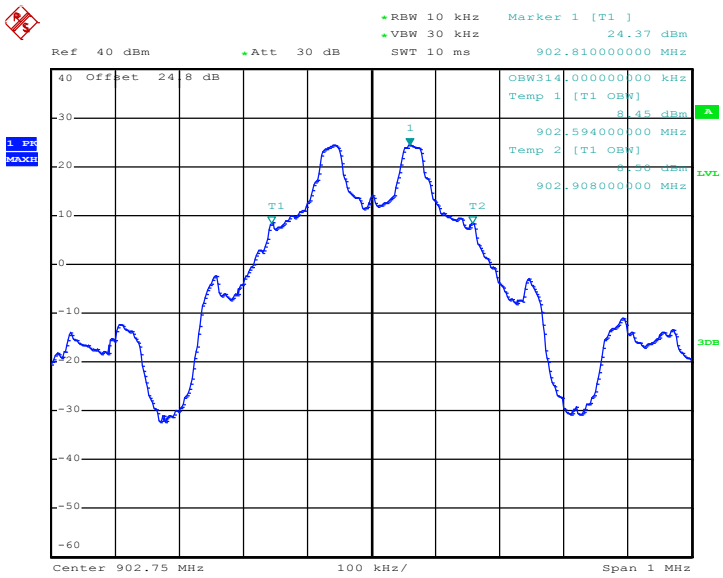
3.4.6 Test Result of 99% Occupied Bandwidth

Mod.	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	Pass/Fail
UHF RFID	1	0	902.75	0.314	Pass
UHF RFID	1	24	914.75	0.322	Pass
UHF RFID	1	49	927.25	0.334	Pass

99% Occupied Bandwidth Plot on Channel 00



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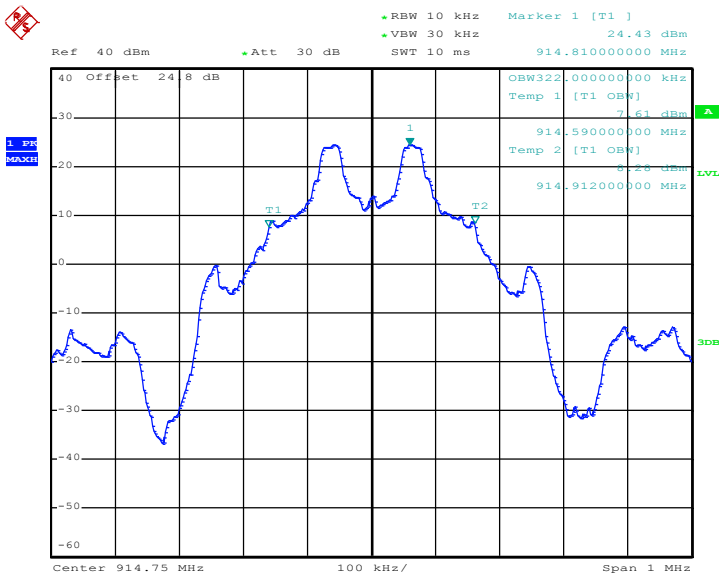
99% Occupied Bandwidth Plot on Channel 24



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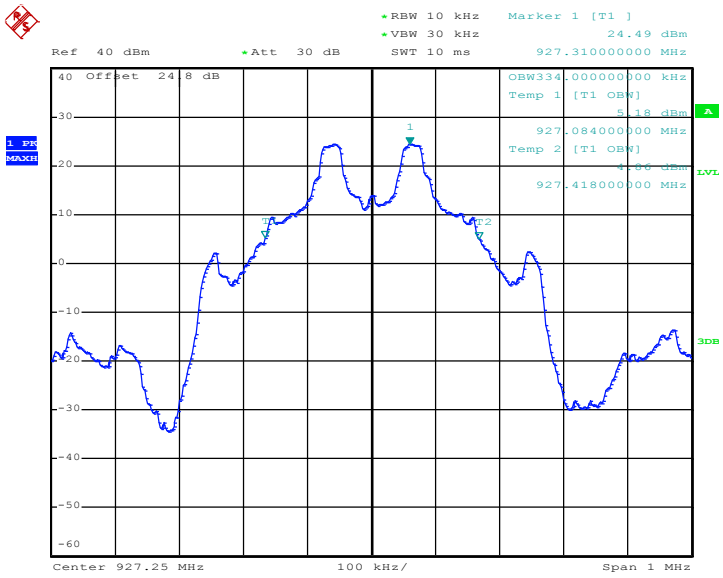
99% Occupied Bandwidth Plot on Channel 49



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Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.5 Output Power Measurement

3.5.1 Limit of Output Power

Section 15.247 (a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:
(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

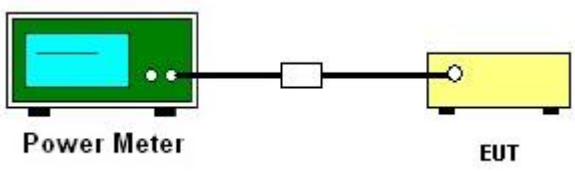
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

3.5.4 Test Setup



3.5.5 Test Result of Output Power

Mod.	CH.	Freq (MHz)	Peak Power (dBm)	Power Limit (dBm)	Test Result
UHF RFID	00	902.75	**29.78**	30.00	Pass
	24	914.75	29.69	30.00	Pass
	49	927.25	29.65	30.00	Pass

Mod.	CH.	Freq (MHz)	Average Power (dBm)	Duty Factor (dB)
UHF RFID	00	902.75	**28.15**	0.00
	24	914.75	28.10	0.00
	49	927.25	28.08	0.00

3.6 Conducted Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

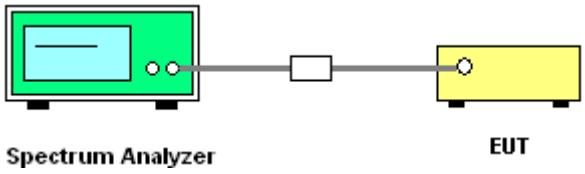
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

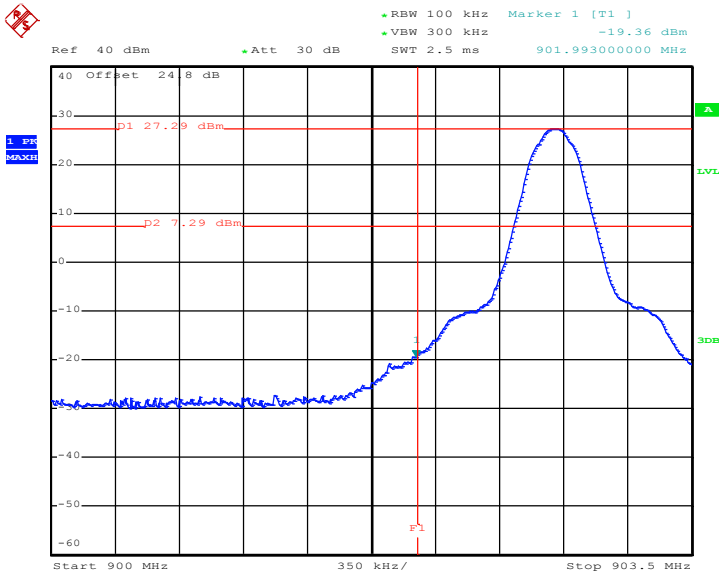
1. The testing follows ANSI C63.10-2013 clause 7.8.6.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz, VBW = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

3.6.4 Test Setup



3.6.5 Test Result of Conducted Band Edges

Low Band Edge Plot on Channel 00



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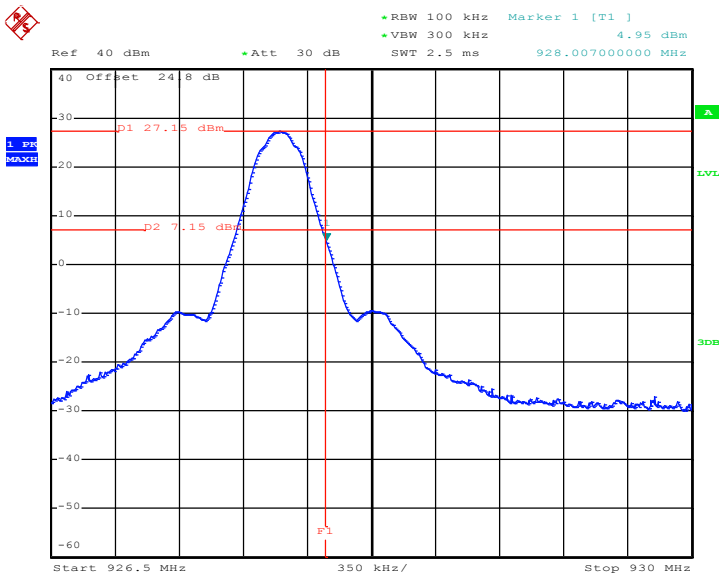
High Band Edge Plot on Channel 49



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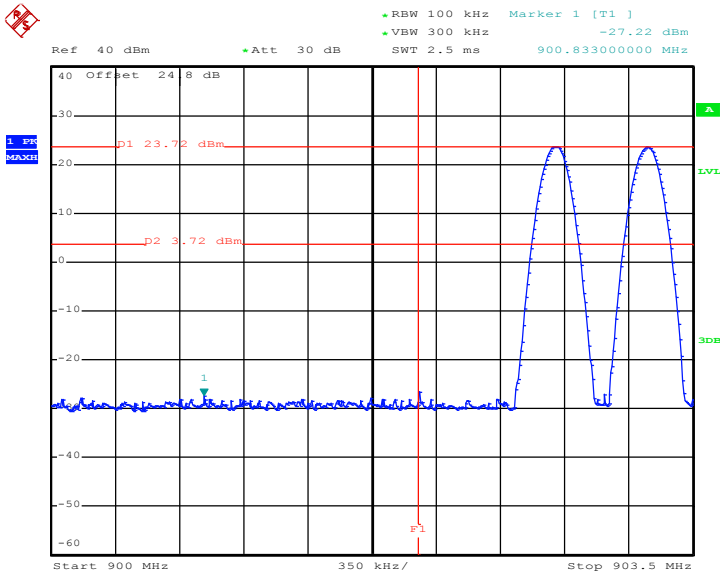
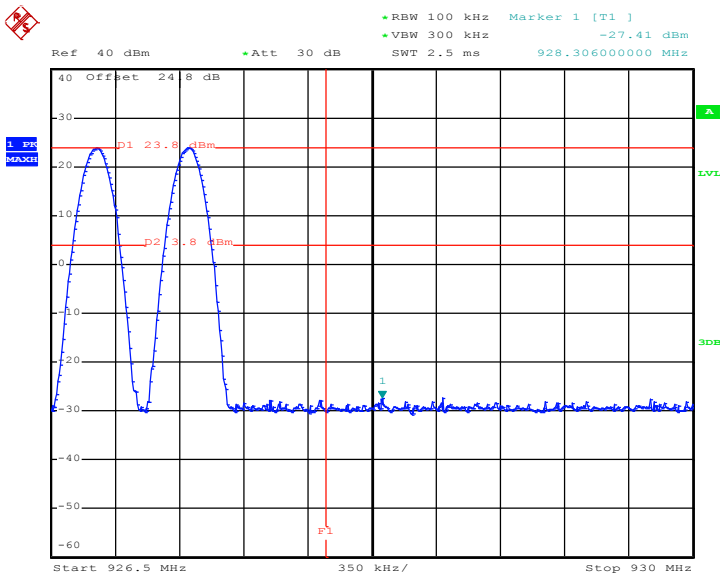
3.6.6 Test Result of Conducted Hopping Mode Band Edges

Hopping Mode Low Band Edge Plot



Date: 27.SEP.2017 18:18:30

Hopping Mode High Band Edge Plot



Date: 28.SEP.2017 11:04:24

3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

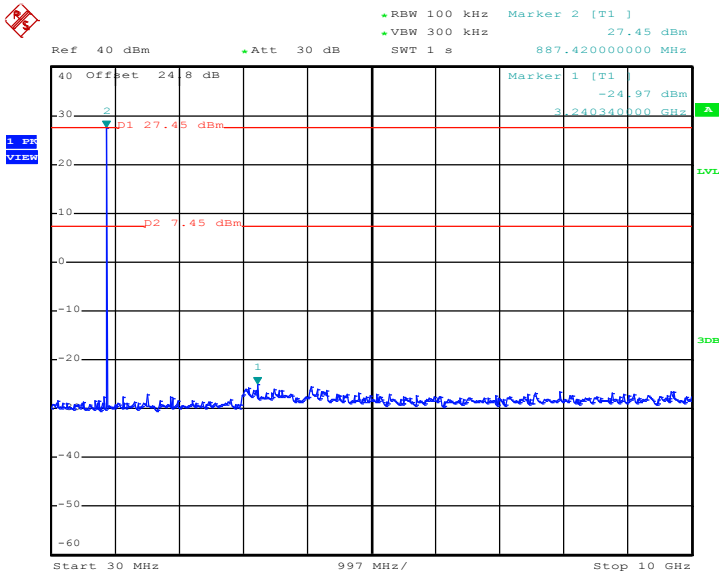
3.7.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.8.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.4 Test Setup

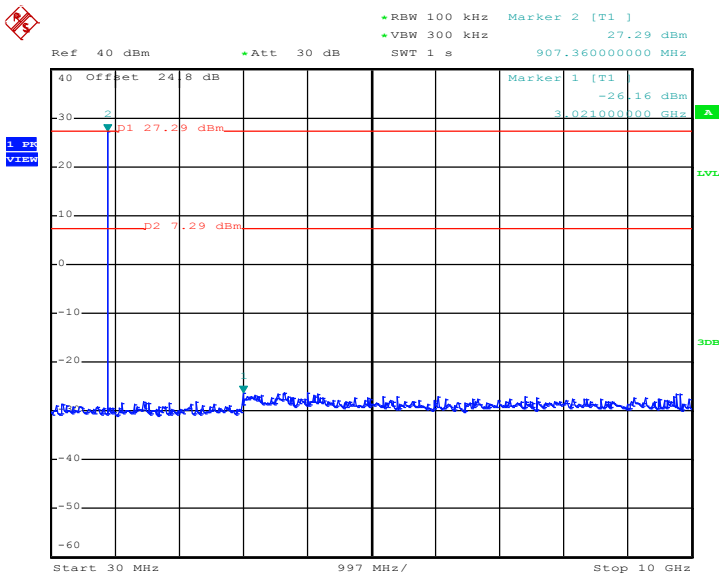
3.7.5 Test Result of Conducted Spurious Emission

CSE Plot on Ch 00 between 30MHz ~ 10 GHz



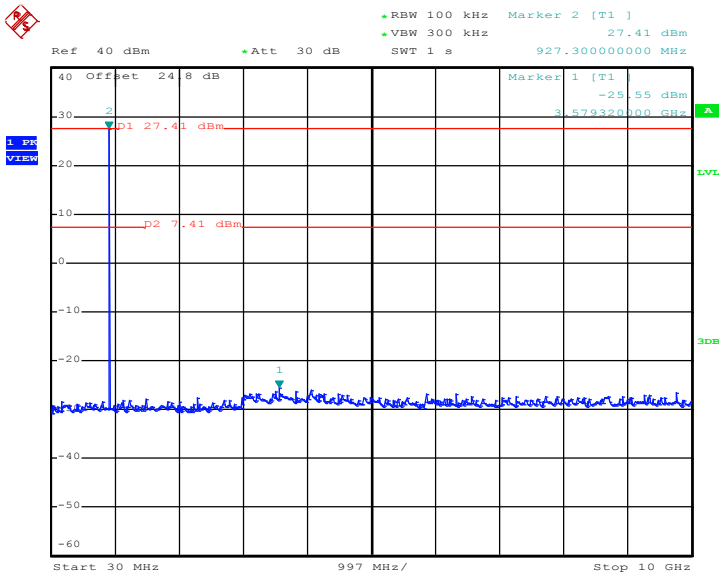
Date: 15.OCT.2017 10:13:06

CSE Plot on Ch 24 between 30MHz ~ 10 GHz



Date: 15.OCT.2017 10:10:27

CSE Plot on Ch 49 between 30MHz ~ 10 GHz



Date: 15.OCT.2017 10:08:45

3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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
Above 960	500	3

3.8.2 Measuring Instruments

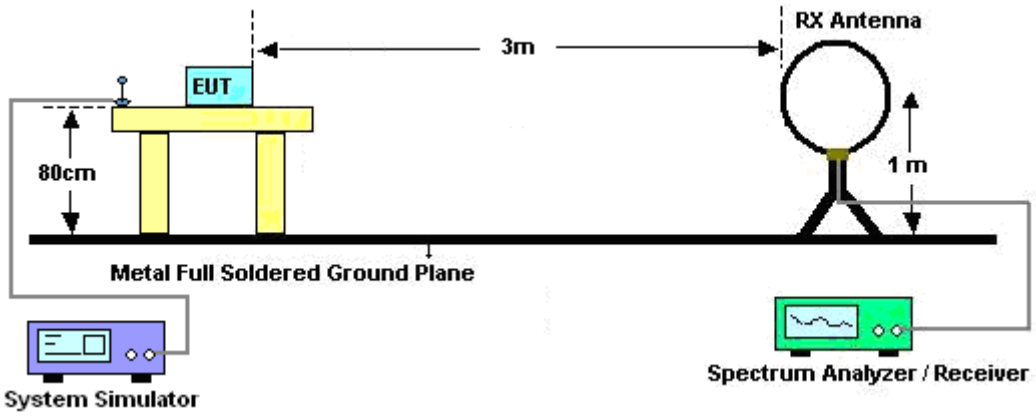
The measuring equipment is listed in the section 4 of this test report.

3.8.3 Test Procedures

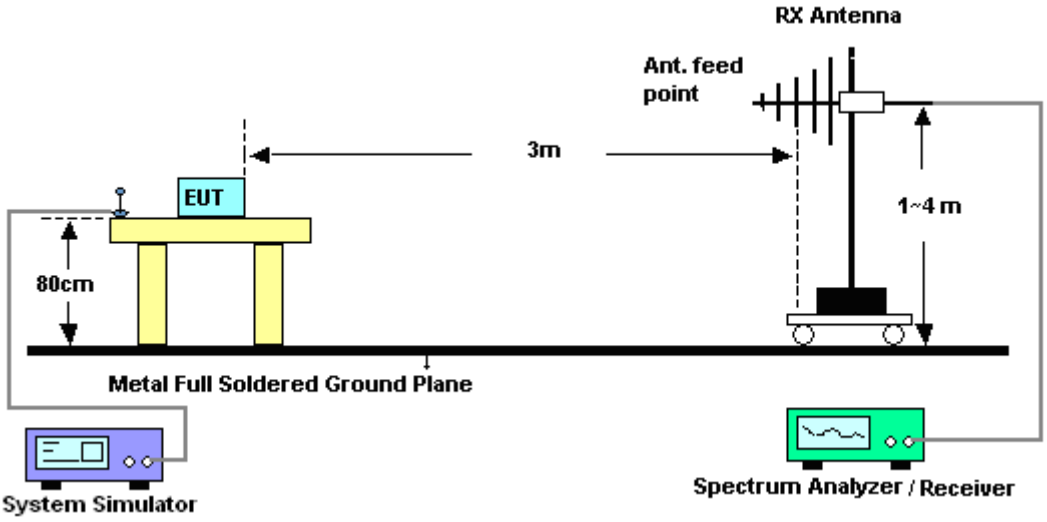
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   Duty cycle = On time/100 milliseconds
   On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$
   Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.8.4 Test Setup

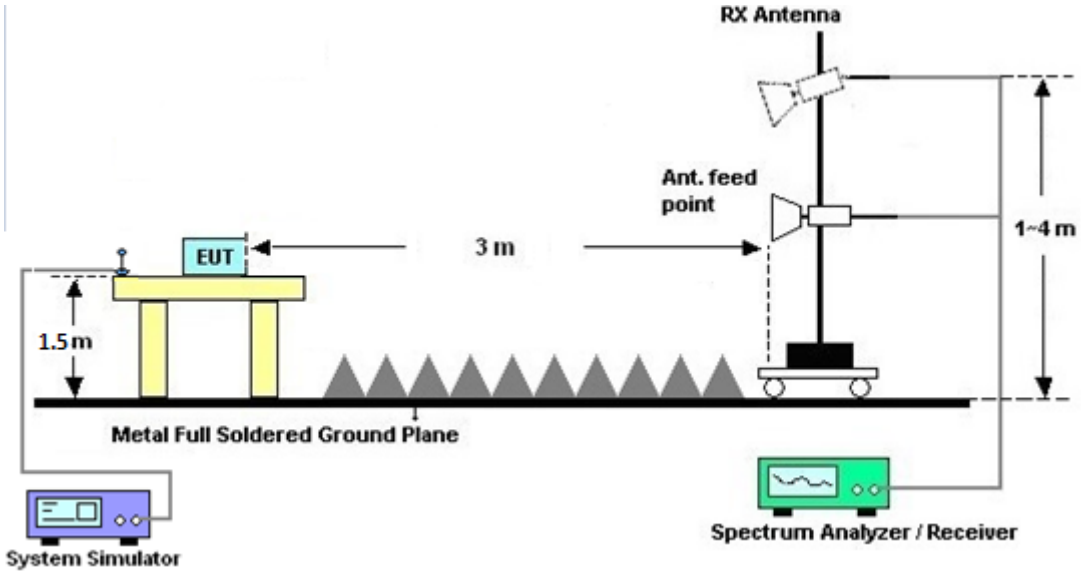
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

3.8.7 Duty Cycle

Please refer to Appendix B.

3.8.8 Test Result of Radiated Spurious Emission

Please refer to Appendix A.

3.9 Antenna Requirements

3.9.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

3.9.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.9.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1240001	N/A	Sep. 07, 2017	Sep. 19, 2017~ Oct. 15, 2017	Sep. 06, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz	Sep. 07, 2017	Sep. 19, 2017~ Oct. 15, 2017	Sep. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 25, 2016	Sep. 19, 2017~ Oct. 15, 2017	Nov. 24, 2017	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Jan. 07, 2017	Sep. 27, 2017~ Sep. 28, 2017	Jan. 06, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Sep. 27, 2017~ Sep. 28, 2017	Aug. 22, 2018	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 12, 2017	Sep. 27, 2017~ Sep. 28, 2017	Jan. 11, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	May 15, 2017	Sep. 27, 2017~ Sep. 28, 2017	May 14, 2018	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2017	Sep. 27, 2017~ Sep. 28, 2017	Apr. 24, 2018	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 14, 2017	Sep. 27, 2017~ Sep. 28, 2017	Mar. 13, 2018	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Sep. 27, 2017~ Sep. 28, 2017	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Sep. 27, 2017~ Sep. 28, 2017	N/A	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.7**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.7**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.5**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

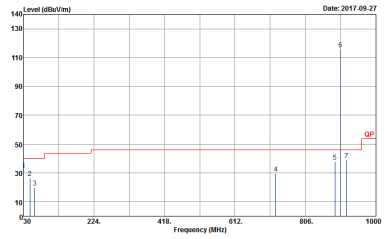
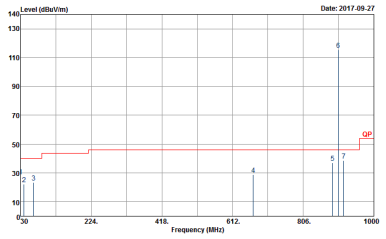
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2**

Appendix A. Radiated Spurious Emission Plots

Test Engineer :	Jesse Wang, Stan Hsieh and James Chiu	Temperature :	24~25℃
		Relative Humidity :	53~55%

902.75 ~ 927.25 MHz

UHF (30MHz ~ 1GHz @ 3m)

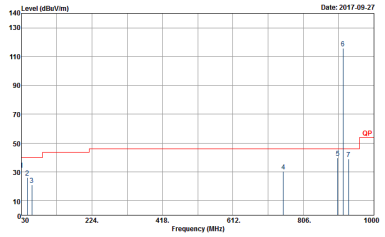
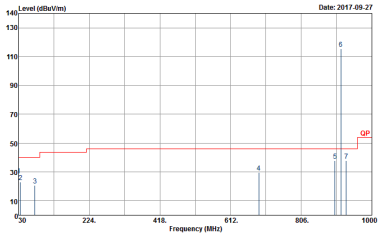
UHF	902.75 ~ 927.25 MHz UHF (30MHz ~ 1GHz @ 3m)	
	UHF CH00 902.75 MHz	
	Horizontal	Vertical
Peak Avg.		

Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) HORIZONTAL
Project : 782919
Mode : 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	32.06	-7.94	40.00	35.70	26.00	1.71	31.35	---	---	Peak
2	48.36	26.35	-13.65	40.00	40.31	15.93	1.71	31.60	---	---	Peak
3	61.59	20.04	-19.96	40.00	37.39	12.14	2.11	31.60	---	---	Peak
4	724.20	29.77	-16.23	46.00	28.83	26.79	4.81	30.66	---	---	Peak
5	887.30	37.86	-8.14	46.00	34.20	28.92	5.27	30.53	---	---	Peak
6 *	902.75	115.74	69.74	46.00	111.86	29.07	5.33	30.52	---	---	Peak
7	918.80	39.15	-6.85	46.00	34.89	29.45	5.33	30.52	100	0	Peak

Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) VERTICAL
Project : 782919
Mode : 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.27	27.78	-12.22	40.00	31.42	26.00	1.71	31.35	---	---	Peak
2	39.72	22.28	-17.72	40.00	31.65	20.40	1.71	31.48	---	---	Peak
3	65.91	23.55	-16.45	40.00	40.61	12.42	2.11	31.59	---	---	Peak
4	668.90	28.84	-17.16	46.00	28.73	26.09	4.75	30.73	---	---	Peak
5	886.60	37.10	-8.90	46.00	33.44	28.92	5.27	30.53	---	---	Peak
6 *	902.75	115.29	69.29	46.00	111.41	29.07	5.33	30.52	---	---	Peak
7	917.40	38.57	-7.43	46.00	34.34	29.42	5.33	30.52	100	0	Peak

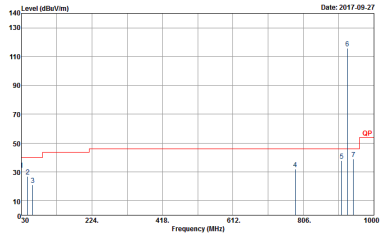
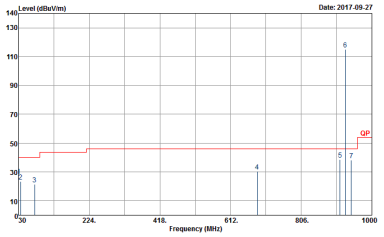
UHF	902.75 ~ 927.25 MHz UHF (30MHz ~ 1GHz @ 3m)	
	UHF CH24 914.75 MHz	
	Horizontal	Vertical
Peak Avg.		

Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) HORIZONTAL
Project : 782919
Mode : 2

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos		Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	31.74	-8.26	40.00	35.38	26.00	1.71	31.35	---	---	Peak
2	46.74	26.15	-13.85	40.00	39.24	16.77	1.71	31.57	---	---	Peak
3	58.62	21.22	-18.78	40.00	38.80	12.31	1.71	31.60	---	---	Peak
4	750.80	30.61	-15.39	46.00	29.15	27.21	4.88	30.63	---	---	Peak
5	899.90	39.71	-6.29	46.00	35.96	29.00	5.27	30.52	100	0	Peak
6 *	914.75	115.92	69.92	46.00	111.76	29.35	5.33	30.52	---	---	Peak
7	930.00	38.99	-7.01	46.00	34.45	29.73	5.33	30.52	---	---	Peak

Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) VERTICAL
Project : 782919
Mode : 2

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos		Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	27.84	-12.16	40.00	31.48	26.00	1.71	31.35	---	---	Peak
2	34.86	23.01	-16.99	40.00	29.42	23.30	1.71	31.42	---	---	Peak
3	75.09	20.77	-19.23	40.00	36.99	13.25	2.11	31.58	---	---	Peak
4	689.90	29.60	-16.40	46.00	29.25	26.29	4.75	30.69	---	---	Peak
5	898.50	37.91	-8.09	46.00	34.17	28.99	5.27	30.52	100	0	Peak
6 *	914.75	115.55	69.55	46.00	111.39	29.35	5.33	30.52	---	---	Peak
7	929.30	37.82	-8.18	46.00	33.30	29.71	5.33	30.52	---	---	Peak

UHF	902.75 ~ 927.25 MHz UHF (30MHz ~ 1GHz @ 3m)	
	UHF CH49 927.25 MHz	
	Horizontal	Vertical
Peak Avg.		

Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) HORIZONTAL
Project : 782919
Mode : 3

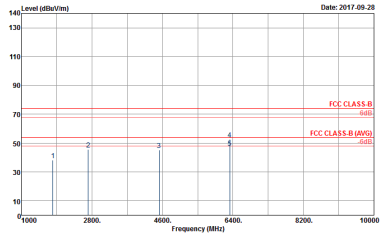
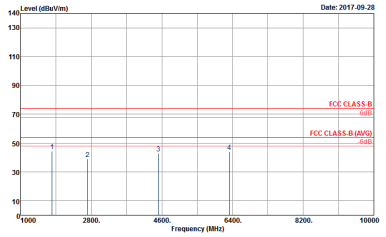
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	31.54	-8.46	40.00	35.18	26.00	1.71	31.35	---	---	Peak
2	47.28	26.89	-13.11	40.00	40.41	16.35	1.71	31.58	---	---	Peak
3	61.32	20.97	-19.03	40.00	38.39	12.07	2.11	31.60	---	---	Peak
4	783.70	31.83	-14.17	46.00	29.91	27.54	4.98	30.60	---	---	Peak
5	911.10	37.91	-8.09	46.00	33.84	29.26	5.33	30.52	---	---	Peak
6 *	927.25	115.88	69.88	46.00	111.41	29.66	5.33	30.52	---	---	Peak
7	943.30	38.93	-7.07	46.00	33.99	30.06	5.40	30.52	100	0	Peak

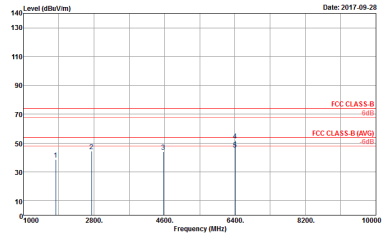
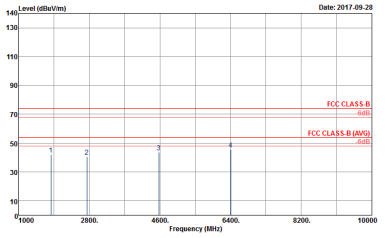
Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) VERTICAL
Project : 782919
Mode : 3

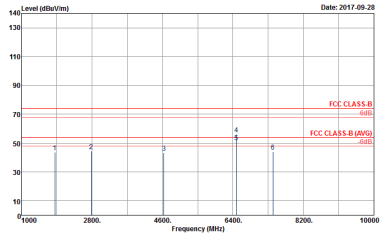
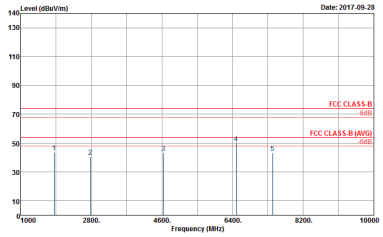
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	27.22	-12.78	40.00	30.86	26.00	1.71	31.35	---	---	Peak
2	35.67	23.54	-16.46	40.00	30.54	22.72	1.71	31.43	---	---	Peak
3	74.01	21.29	-18.71	40.00	37.63	13.14	2.11	31.59	---	---	Peak
4	685.00	30.25	-15.75	46.00	29.95	26.25	4.75	30.70	---	---	Peak
5	912.50	38.44	-7.56	46.00	34.32	29.31	5.33	30.52	100	0	Peak
6 *	927.25	115.23	69.23	46.00	110.76	29.66	5.33	30.52	---	---	Peak
7	943.30	38.12	-7.88	46.00	33.18	30.06	5.40	30.52	---	---	Peak

902.75 ~ 927.25 MHz

UHF (1GHz ~ 10GHz @ 3m)

UHF	902.75 ~ 927.25 MHz UHF (1GHz ~ 10GHz @ 3m)	
	UHF CH00 902.75 MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH07-HY Condition : FCC CLASS-B 3m HF_ANT_00075962 HORIZONTAL Project : 782919 Mode : 1 Freq Level Over Limit Limit ReadAntenna Level Cable Loss Preamp Factor A/Pos T/Pos Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 1805.00 38.18 -35.82 74.00 60.45 29.72 7.59 59.58 --- --- Peak 2 2708.00 45.80 -28.20 74.00 64.34 32.28 8.60 59.42 --- --- Peak 3 4513.00 45.15 -28.85 74.00 60.11 34.30 10.61 59.87 --- --- Peak 4 6319.00 52.66 -21.34 74.00 59.46 36.04 13.52 56.36 100 116 Peak 5 6319.00 46.87 -7.13 54.00 53.67 36.04 13.52 56.36 100 116 Average	 Site : 03CH07-HY Condition : FCC CLASS-B 3m HF_ANT_00075962 VERTICAL Project : 782919 Mode : 1 Freq Level Over Limit Limit ReadAntenna Level Cable Loss Preamp Factor A/Pos T/Pos Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 1805.00 44.61 -29.39 74.00 66.88 29.72 7.59 59.58 100 210 Peak 2 2708.00 38.84 -35.16 74.00 57.38 32.28 8.60 59.42 --- --- Peak 3 4513.00 42.75 -31.25 74.00 57.71 34.30 10.61 59.87 --- --- Peak 4 6319.00 44.17 -29.83 74.00 50.97 36.04 13.52 56.36 --- --- Peak

UHF	902.75 ~ 927.25 MHz UHF (1GHz ~ 10GHz @ 3m)	
	UHF CH24 914.75 MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH07-HY Condition : FCC CLASS-B 3m HF_ANT_00075962 HORIZONTAL Project : 782919 Mode : 2 Freq Level Over Limit Limit Line ReadAntenna Level Cable Factor Preamp Loss Factor A/Pos T/Pos Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 1829.00 38.73 -35.27 74.00 60.70 29.93 7.67 59.57 --- --- Peak 2 2744.00 44.63 -29.37 74.00 63.06 32.30 8.67 59.40 --- --- Peak 3 4573.00 44.14 -29.86 74.00 59.11 34.29 10.53 59.79 --- --- Peak 4 6403.00 51.99 -22.01 74.00 58.69 36.16 13.52 56.38 100 114 Peak 5 6403.00 45.68 -8.32 54.00 52.38 36.16 13.52 56.38 100 114 Average	 Site : 03CH07-HY Condition : FCC CLASS-B 3m HF_ANT_00075962 VERTICAL Project : 782919 Mode : 2 Freq Level Over Limit Limit Line ReadAntenna Level Cable Factor Preamp Loss Factor A/Pos T/Pos Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 1829.00 42.00 -32.00 74.00 63.97 29.93 7.67 59.57 --- --- Peak 2 2744.00 40.41 -33.59 74.00 58.84 32.30 8.67 59.40 --- --- Peak 3 4573.00 43.59 -30.41 74.00 58.56 34.29 10.53 59.79 --- --- Peak 4 6403.00 45.79 -28.21 74.00 52.49 36.16 13.52 56.38 100 220 Peak

UHF	902.75 ~ 927.25 MHz UHF (1GHz ~ 10GHz @ 3m)	
	UHF CH49 927.25 MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH07-HY Condition : FCC CLASS-B 3m HF_ANT_00075962 HORIZONTAL Project : 782919 Mode : 3	 Site : 03CH07-HY Condition : FCC CLASS-B 3m HF_ANT_00075962 VERTICAL Project : 782919 Mode : 3

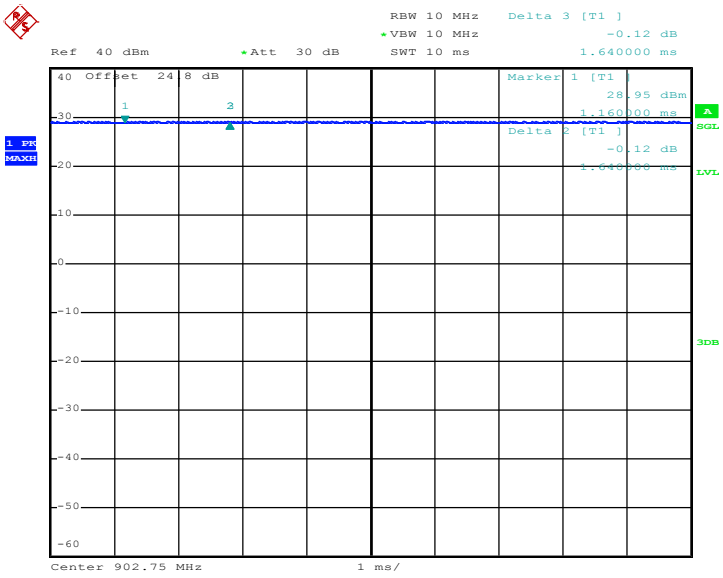
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1852.00	43.51	-30.49	74.00	65.36	30.04	7.67	59.56	---	---	Peak
2	2782.00	44.48	-29.52	74.00	62.82	32.31	8.74	59.39	---	---	Peak
3	4636.00	43.43	-30.57	74.00	58.09	34.27	10.75	59.68	---	---	Peak
4	6490.00	56.05	-17.95	74.00	62.44	36.28	13.73	56.40	100	215	Peak
5	6490.00	50.51	-3.49	54.00	56.90	36.28	13.73	56.40	100	215	Average
6	7420.00	43.94	-30.06	74.00	51.36	35.64	15.08	58.14	---	---	Peak
7	10198.00	46.57	-27.43	74.00	51.27	37.06	17.68	59.44	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1852.00	43.78	-30.22	74.00	65.63	30.04	7.67	59.56	---	---	Peak
2	2782.00	40.56	-33.44	74.00	58.90	32.31	8.74	59.39	---	---	Peak
3	4636.00	43.28	-30.72	74.00	57.94	34.27	10.75	59.68	---	---	Peak
4	6490.00	49.86	-24.14	74.00	56.25	36.28	13.73	56.40	100	183	Peak
5	7420.00	43.31	-30.69	74.00	50.73	35.64	15.08	58.14	---	---	Peak
6	10198.00	44.76	-29.24	74.00	49.46	37.06	17.68	59.44	---	---	Peak

Appendix B. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
UHF	100	-	-	10Hz

UHF



Date: 19.SEP.2017 05:39:07