FCC Test Report

Report No.:	RF160427C13-1
FCC ID:	HFS-P91
Test Model:	Sensor Version 2
Received Date:	Apr. 27, 2016
Test Date:	May 20, 2016 ~ Jul. 21, 2016
Issued Date:	Jul. 27, 2016
Applicant:	Quanta Computer Inc.
Address:	No.188, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Table of Contents

Release Control Record 3

1 Certificate of Conformity 4

2 Summary of Test Results 5

2.1 Measurement Uncertainty 5
2.2 Modification Record 5

3 General Information 6

3.1 General Description of EUT 6
3.2 Description of Test Modes 6
3.2.1 Test Mode Applicability and Tested Channel Detail 7
3.3 Duty Cycle of Test Signa 8
3.4 Description of Support Units 9
3.4.1 Configuration of System under Test 9
3.5 General Description of Applied Standards 9

4 Test Types and Results 10

4.1 Radiated Emission Measurement 10
4.1.1 Limits of Radiated Emission Measurement 10
4.1.2 Test Instruments 11
4.1.3 Test Procedures 12
4.1.4 Deviation from Test Standard 12
4.1.5 Test Set Up 13
4.1.6 EUT Operating Conditions 13
4.1.7 Test Results 14
4.2 20dB Bandwidth Measurement 18
4.2.1 Limits of 20dB Bandwidth Measurement 18
4.2.2 Test Setup 18
4.2.3 Test Instruments 18
4.2.4 Test Procedure 18
4.2.5 Deviation fromTest Standard 18
4.2.6 EUT Operating Conditions 18
4.2.7 Test Result 19
4.3 Deactivation Time Measurement 20
4.3.1 Limits Of Deactivation Time Measurement 20
4.3.2 Test Setup 20
4.3.3 Test Instruments 20
4.3.4 Test Procedures 20
4.3.5 Deviation from Test Standard 20
4.3.6 EUT Operating Conditions 20
4.3.7 Test Results 21

5 Pictures of Test Arrangements 22

Appendix – Information on the Testing Laboratories 23

Release Control Record

Issue No.	Description	Date Issued
RF160427C13-1	Original Release	Jul. 27, 2016

1 Certificate of Conformity

Product:	Parkifi Sensor Version 2
Brand:	Parkifi
Test Model:	Sensor Version 2
Sample Status:	Production Unit
Applicant:	Quanta Computer Inc.
Test Date:	May 20, 2016 ~ Jul. 21, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.231) ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Evonne Liu , **Date:** Jul. 27, 2016

Evonne Liu / Specialist

Approved by : Stanley Wu , **Date:** Jul. 27, 2016

Stanley Wu / Assistant Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.231)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Without AC power port of the EUT
15.209 15.231(b)	Radiated Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is –3.98dB at 433MHz.
15.231(c)	Emission Bandwidth Measurement	PASS	Meet the requirement of limit.
15.231(a)	De-activation	PASS	Meet the requirement of limit.

2.1 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:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	0.00 dB
	200MHz ~1000MHz	0.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	0.00 dB
	18GHz ~ 40GHz	0.00 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Parkifi Sensor Version 2
Brand	Parkifi
Test Model	Sensor Version 2
Status of EUT	Production Unit
Power Supply Rating	3Vdc (Li-ion battery)
Modulation Type	GFSK
Transfer Rate	9.6 kbps
Operating Frequency	433 ~ 434 MHz
Number of Channel	21
Antenna Type	Monopole antenna with 1.9 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Battery	JHT	JHT-AT5E6004-A	3 Vdc, 2000 mAh
BT Chip	Nordic	NRF51822-QFAC-R	--
433MHz Chip	TI	CC1120RHBR	--

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

21 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	433.00	6	433.30	11	433.55	16	433.80
1	433.05	7	433.35	12	433.60	17	433.85
2	433.10	8	433.40	13	433.65	18	433.90
3	433.15	9	433.45	14	433.70	19	433.95
4	433.20	10	433.50	15	433.75	20	434.00
5	433.25						

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	RE ≥ 1G	RE < 1G	PLC	EB	DT	
-	√	√	-	√	√	

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **EB:** 20dB Bandwidth measurement
DT: Deactivation Time measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

NOTE: "-"means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
-	0 to 20	0, 20	GFSK	Z

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
-	0 to 20	0, 20	GFSK	Z

Emission Bandwidth Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
-	0 to 20	0	GFSK	Z

Deactivation Time Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

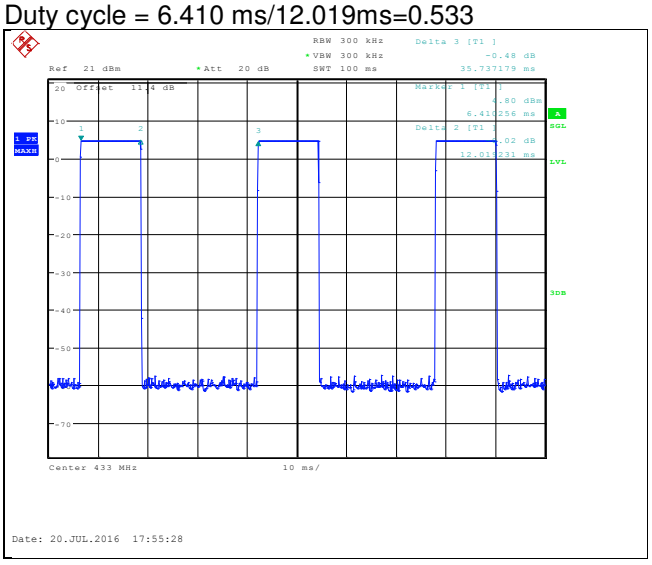
EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
-	0 to 20	0	GFSK	Z

TEST CONDITION:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 65%RH	3 Vdc	Getaz Yang
RE<1G	25deg. C, 65%RH	3 Vdc	Getaz Yang
EB/DT	21deg. C, 60%RH	3 Vdc	Taylor Liu

3.3 Duty Cycle of Test Signa

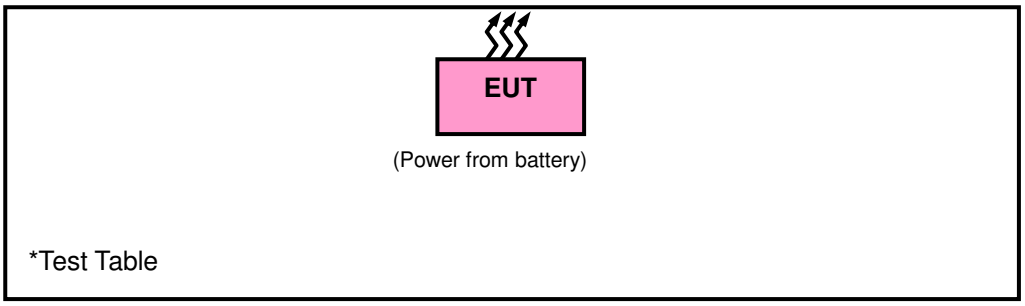
Duty cycle of test signal is <98%
Duty cycle = 6.410 ms/12.019ms=0.533



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.231)
ANSI C63.10- 2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	uV/meter	dBuV/meter	uV/meter	dBuV/meter
40.66 ~ 40.70	2250	67.04	225	48.04
70 ~ 130	1250	61.94	125	41.94
130 ~ 174	1250 ~ 3750	61.94 ~ 71.48	125 ~ 375	41.94 ~ 51.48
174 ~ 260	3750	71.48	375	51.48
260 ~ 470	3750 ~ 12500	71.48 ~ 81.94	375 ~ 1250	51.48 ~ 61.94
Above 470	12500	81.94	1250	61.94

NOTE:

1. Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)- 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.
2. The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep.03, 2015	Sep.02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

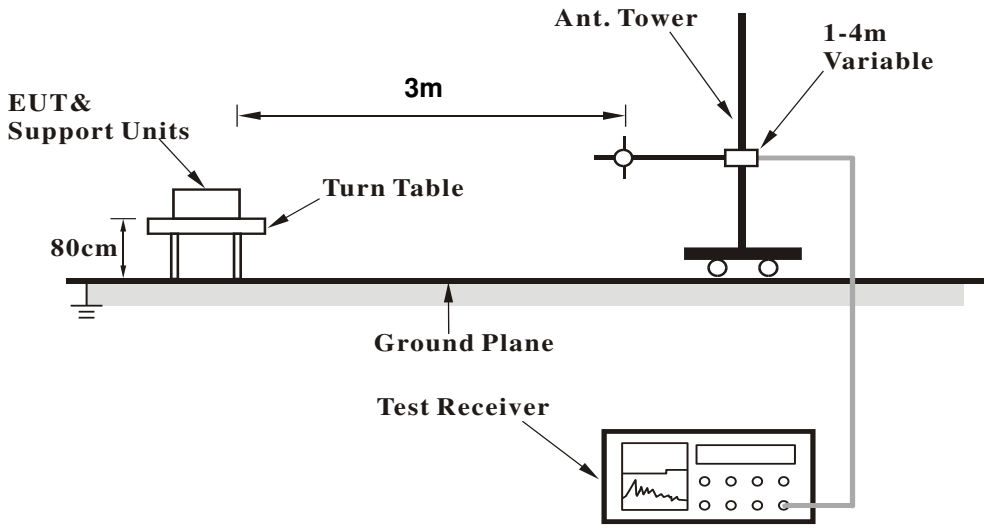
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (no less than 1 Hz) for Average detection (AV) at frequency above 1GHz
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

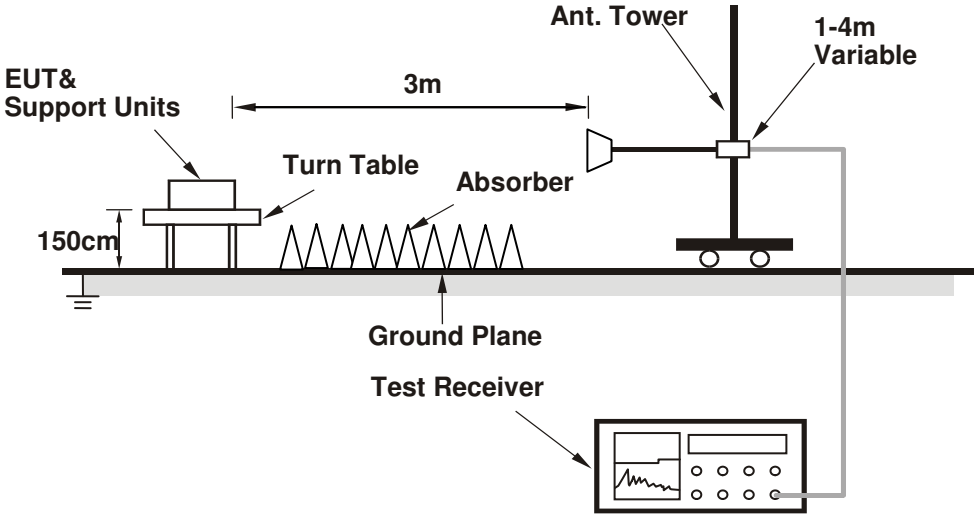
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.

b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

BELOW 1GHz WORST-CASE DATA

EUT Test Condition		Measurement Detail	
Channel	Channel 0	**Frequency Range**	30 MHz ~ 1 GHz
Input Power	3 Vdc	**Detector Function**	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
168.71	37.13	55.85	43.5	-6.37	11.86	1.16	31.74	135	4	QP
305.48	38.61	55.78	46	-7.39	13.08	1.65	31.9	117	163	QP
385.99	38.41	53.53	46	-7.59	15.01	1.87	32	102	244	QP
433	96.5	110.57	100.48	-3.98	15.98	1.96	32.01	107	150	Peak
699.3	35.69	44.22	46	-10.31	20.81	2.45	31.79	111	126	QP
866	71.33	77.52	80.48	-9.15	23.08	2.7	31.97	113	168	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
167.74	32.27	50.92	43.5	-11.23	11.96	1.15	31.76	110	173	QP
304.51	38.17	55.35	46	-7.83	13.06	1.65	31.89	132	27	QP
361.74	38.83	54.56	46	-7.17	14.43	1.8	31.96	127	87	QP
433	94.07	108.14	100.48	-6.41	15.98	1.96	32.01	127	66	Peak
699.3	36.34	44.87	46	-9.66	20.81	2.45	31.79	104	48	QP
866	60.1	66.29	80.48	-20.38	23.08	2.7	31.97	124	169	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value

EUT Test Condition		Measurement Detail	
Channel	Channel 20	**Frequency Range**	30 MHz ~ 1 GHz
Input Power	3 Vdc	**Detector Function**	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
167.74	34.85	53.5	43.5	-8.65	11.96	1.15	31.76	120	308	QP
304.51	38.6	55.78	46	-7.4	13.06	1.65	31.89	114	352	QP
360.77	38.96	54.73	46	-7.04	14.4	1.8	31.97	106	131	QP
434	96.53	110.58	100.52	-3.99	16	1.96	32.01	113	235	Peak
695.42	35.74	44.34	46	-10.26	20.76	2.45	31.81	117	52	QP
868	72	78.18	80.52	-8.52	23.1	2.71	31.99	118	320	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
168.71	33.77	52.49	43.5	-9.73	11.86	1.16	31.74	107	203	QP
305.48	38.16	55.33	46	-7.84	13.08	1.65	31.9	126	41	QP
348.16	38.09	54.07	46	-7.91	14.1	1.76	31.84	124	160	QP
434	91.4	105.45	100.52	-9.12	16	1.96	32.01	107	269	Peak
698.33	37.22	45.77	46	-8.78	20.8	2.45	31.8	133	16	QP
868	57.57	63.75	80.52	-22.95	23.1	2.71	31.99	125	288	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value

ABOVE 1GHz DATA :

EUT Test Condition		Measurement Detail	
Channel	Channel 0	**Frequency Range**	1 GHz ~ 6 GHz
Input Power	3 Vdc	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
1299	23.79	48.64	60.48	-36.69	25.3	3.32	53.47	128	296	Average
1299	37.83	62.68	80.48	-42.65	25.3	3.32	53.47	128	296	Peak
1732	26.76	50.78	60.48	-33.72	25.69	3.87	53.58	100	122	Average
1732	36.47	60.49	80.48	-44.01	25.69	3.87	53.58	100	122	Peak
2165	27.81	50.8	60.48	-32.67	26.28	4.37	53.64	103	234	Average
2165	37.78	60.77	80.48	-42.7	26.28	4.37	53.64	103	234	Peak
2598	26.79	48.19	60.48	-33.69	27.46	4.74	53.6	105	212	Average
2598	38.09	59.49	80.48	-42.39	27.46	4.74	53.6	105	212	Peak
3031	26.83	47.05	60.48	-33.65	28.51	5.12	53.85	100	147	Average
3031	38.49	58.71	80.48	-41.99	28.51	5.12	53.85	100	147	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
1299	25.55	50.4	60.48	-34.93	25.3	3.32	53.47	139	189	Average
1299	37.71	62.56	80.48	-42.77	25.3	3.32	53.47	139	189	Peak
1732	29.51	53.53	60.48	-30.97	25.69	3.87	53.58	140	185	Average
1732	39.41	63.43	80.48	-41.07	25.69	3.87	53.58	140	185	Peak
2165	30.15	53.14	60.48	-30.33	26.28	4.37	53.64	128	160	Average
2165	38.88	61.87	80.48	-41.6	26.28	4.37	53.64	128	160	Peak
2598	29.8	51.2	60.48	-30.68	27.46	4.74	53.6	103	24	Average
2598	38.72	60.12	80.48	-41.76	27.46	4.74	53.6	103	24	Peak
3031	27.25	47.47	60.48	-33.23	28.51	5.12	53.85	116	203	Average
3031	39.54	59.76	80.48	-40.94	28.51	5.12	53.85	116	203	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value

EUT Test Condition		Measurement Detail	
Channel	Channel 20	**Frequency Range**	1 GHz ~ 6 GHz
Input Power	3 Vdc	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
1302	23.88	48.72	60.52	-36.64	25.3	3.33	53.47	100	132	Average
1302	34.72	59.56	80.52	-45.8	25.3	3.33	53.47	100	132	Peak
1736	26.53	50.53	60.52	-33.99	25.69	3.89	53.58	100	120	Average
1736	35.99	59.99	80.52	-44.53	25.69	3.89	53.58	100	120	Peak
2170	27.27	50.26	60.52	-33.25	26.28	4.37	53.64	102	256	Average
2170	38.24	61.23	80.52	-42.28	26.28	4.37	53.64	102	256	Peak
2604	27.38	48.76	60.52	-33.14	27.46	4.76	53.6	102	148	Average
2604	38.85	60.23	80.52	-41.67	27.46	4.76	53.6	102	148	Peak
3038	27.67	47.86	60.52	-32.85	28.52	5.14	53.85	100	135	Average
3038	38.4	58.59	80.52	-42.12	28.52	5.14	53.85	100	135	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
1302	25.64	50.48	60.52	-34.88	25.3	3.33	53.47	100	185	Average
1302	34.53	59.37	80.52	-45.99	25.3	3.33	53.47	100	185	Peak
1736	28.64	52.64	60.52	-31.88	25.69	3.89	53.58	112	315	Average
1736	38.78	62.78	80.52	-41.74	25.69	3.89	53.58	112	315	Peak
2170	29.89	52.88	60.52	-30.63	26.28	4.37	53.64	101	239	Average
2170	41.71	64.7	80.52	-38.81	26.28	4.37	53.64	101	239	Peak
2604	29.9	51.28	60.52	-30.62	27.46	4.76	53.6	103	108	Average
2604	38.69	60.07	80.52	-41.83	27.46	4.76	53.6	103	108	Peak
3038	27.87	48.06	60.52	-32.65	28.52	5.14	53.85	100	42	Average
3038	38.09	58.28	80.52	-42.43	28.52	5.14	53.85	100	42	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value

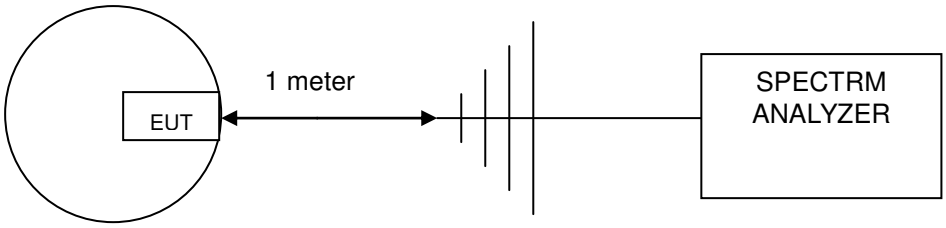
4.2 20dB Bandwidth Measurement

4.2.1 Limits of 20dB Bandwidth Measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.

Fundamental Frequency (MHz)	Limit Of Emission Bandwidth (kHz)
433	980

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

a. The EUT was placed on the turn table.

b. The signal was coupled to the spectrum analyzer through an antenna.

c. Set the resolution bandwidth to 300 kHz and video bandwidth to 300 kHz then select Peak function to scan the channel frequency.

d. The emission bandwidth was measured and recorded.

4.2.5 Deviation fromTest Standard

No deviation.

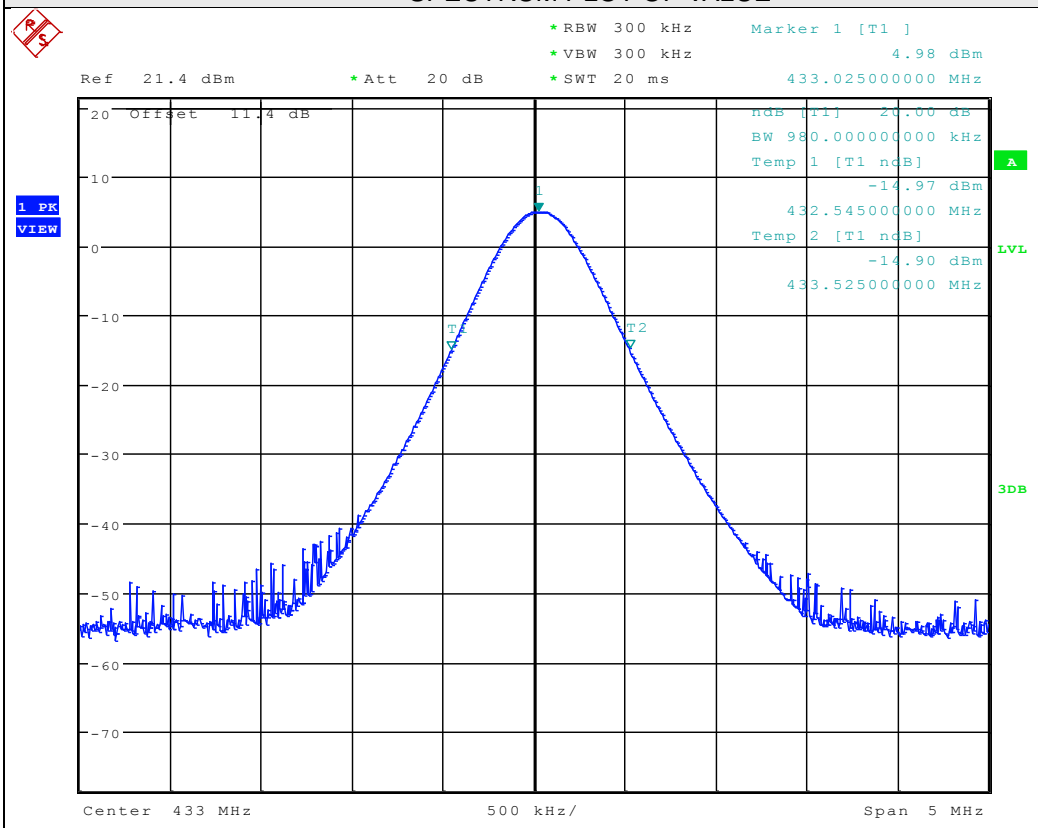
4.2.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 Test Result

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Maximum Limit (MHz)	Pass / Fail
1	433	0.98	1.0825	Pass

SPECTRUM PLOT OF VALUE

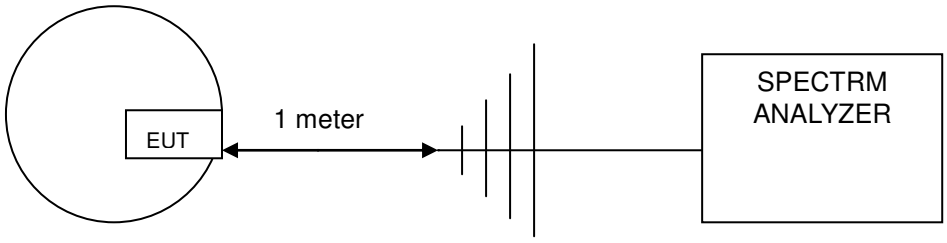


4.3 Deactivation Time Measurement

4.3.1 Limits Of Deactivation Time Measurement

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

a. The EUT was placed on the turning table.

b. The signal was coupled to the spectrum analyzer through an antenna.

c. Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz. The spectrum analyser was turned to the centre frequency of the transmitter's and the analyser's marker function was used to determine the duration of transmission.

d. The transmission duration was measured and recorded.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.3.6.

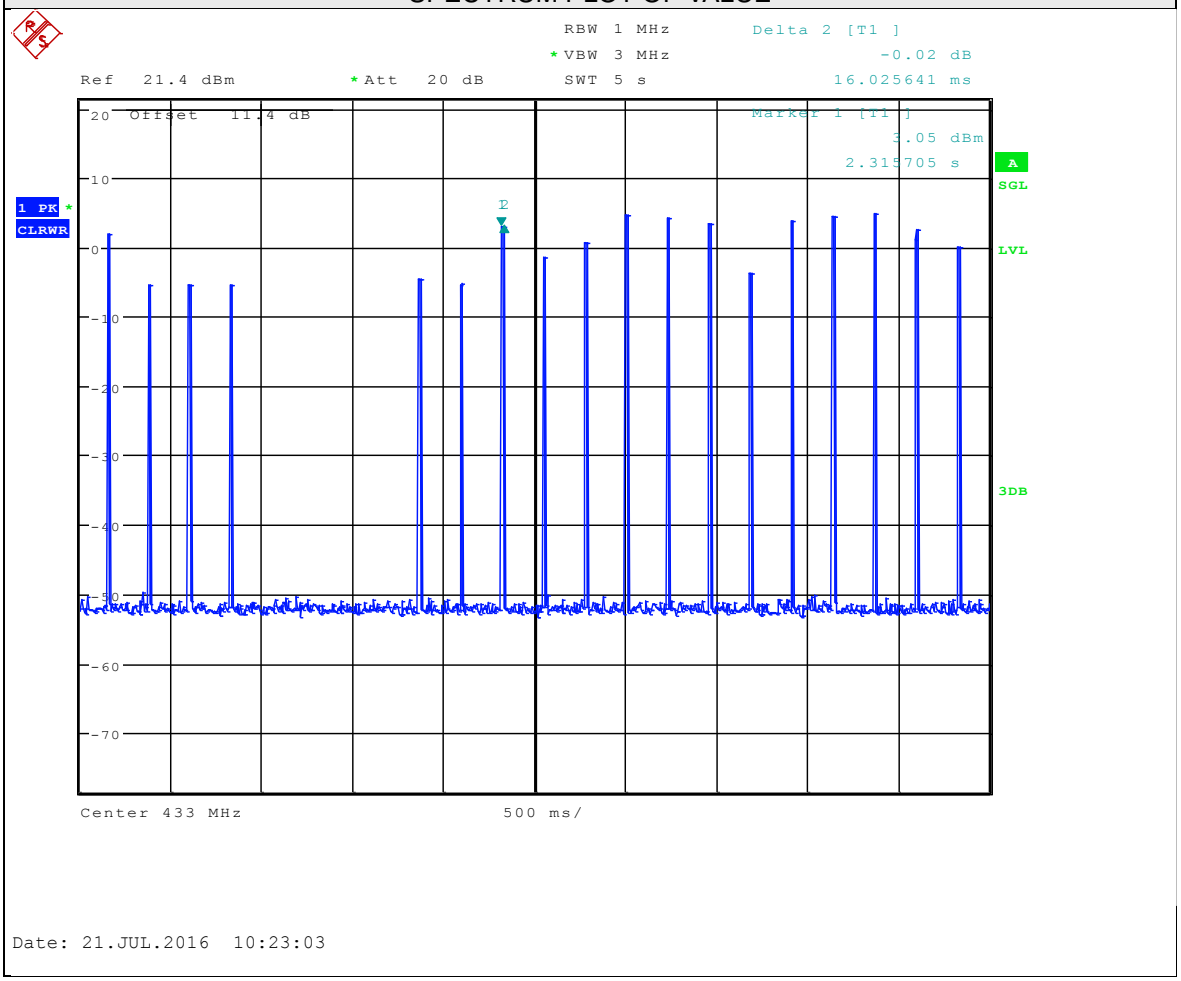
4.3.7 Test Results

Frequency (MHz)	Activation Time (s)	Limit: not more than 5 seconds of being released (s)	Conclusion
433	0.2884	5	Pass

* Activation Time=Ton*PLUSE

=16.025*18 = 0.2884

SPECTRUM PLOT OF VALUE



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---