FCC RF Test Report

APPLICANT	:	Ring LLC
EQUIPMENT	:	Ring Car Cam
BRAND NAME	:	Ring
MODEL NAME	:	5B28S9
FCC ID	:	2AEUPBHACC001
STANDARD	:	FCC Part 15 Subpart C §15.249
CLASSIFICATION	:	(DXX) Low Power Communication Device Transmitter
TEST DATE(S)	:	Jan. 26, 2022 ~ Feb. 21, 2022

We, Sporton International Inc. (Kunshan), 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. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alexwang

Approved by: Alex Wang / Manager

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR1O0826H	Rev. 01	Initial issue of report	Mar. 01, 2022

SUMMARY OF TEST RESULT

Part	FCC Rule ISED Rule	Description of Test	Result	Remark
-	15.207	AC Power Line Conducted Emissions	Not Required	-
3.1	2.1049	20dB Bandwidth	Complies	-
3.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	Under limit 12.73 dB at 5800.00 MHz
3.2	15.249(a)(d)	Radiated Spurious Emissions	Complies	Under limit 4.11 dB at 5875.00 MHz
3.3	15.203	Antenna Requirements	Complies	-

Remark 1: Not required means after assessing, test item is not necessary to carry out.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Ring LLC
1523 26th Street, Santa Monica, CA 90404 USA

1.2 Manufacturer

Ring LLC
1523 26th Street, Santa Monica, CA 90404 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Ring Car Cam
Brand Name	Ring
Model Name	5B28S9
FCC ID	2AEUPBHACC001
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.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Frequency Range	5725 MHz ~ 5875 MHz
Max. Field Strength	101.27 dBµV/m
Antenna Type / Gain	Loop Antenna with gain 0.2 dBi

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH06-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24al

1.8 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 §15.249
- 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 Descriptions of Test Mode

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode
Field Strength of Fundamental Emissions	CTX
Bandwidth	CTX
Radiated Emissions	CTX

Note:

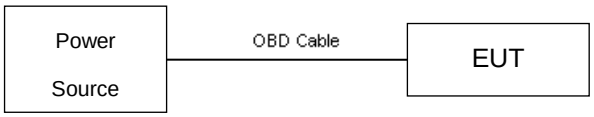
1. CTX=continuously transmitting.
2. The programmed RF utility, “Test Tool” installed in the notebook to make the EUT get into the engineering modes to continuously transmit.

2.2 Test Mode

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

Summary table of Test Cases	
Test Item	**MPS**
Conducted TCs	Mode 1: 5735MHz Mode 2: 5800MHz Mode 3: 5865MHz
Radiated TCs	Mode 1: 5735MHz Mode 2: 5800MHz Mode 3: 5865MHz

2.3 Test Configurations



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	N/A	N/A	N/A	N/A	N/A
2.	OBD cable	Ring	5B29S1	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 1.5 dB.

Offset(dB) = RF cable loss(dB).

= 1.5 (dB)

3 Test Result

3.1 20dB Bandwidth

3.1.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band.

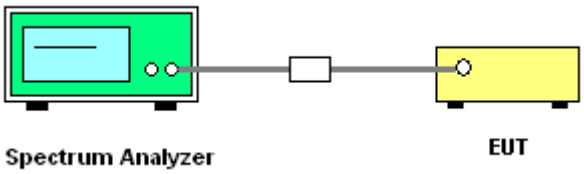
3.1.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.1.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna.
2. The RBW is set to approximately 1% of the EBW, the VBW is set to 3 times the RBW.
3. Measured the spectrum width with power higher than 20dB below carrier.

3.1.4 Test Setup

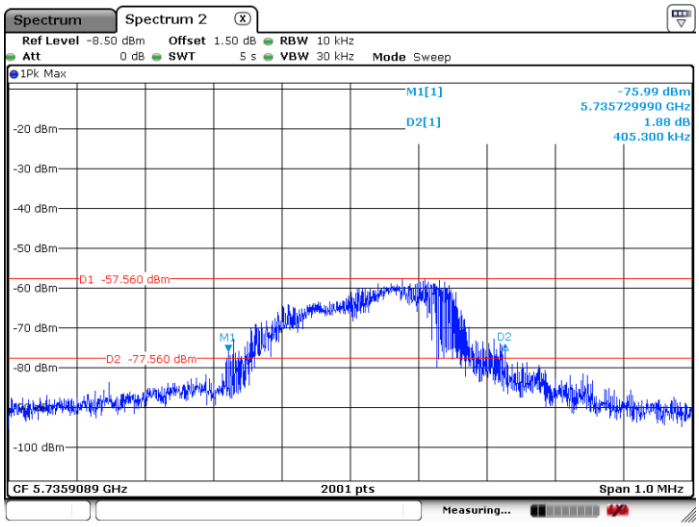


3.1.5 Test Result of 20dB Spectrum Bandwidth

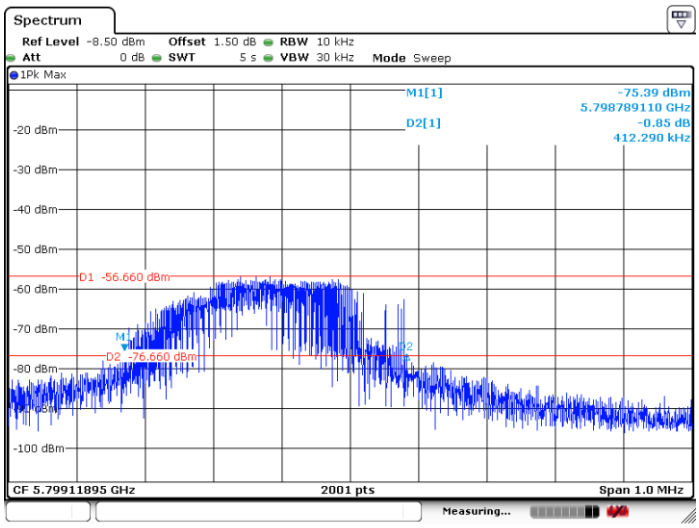
Temperature :	21~25℃	**Relative Humidity :**	51~54%
Test Engineer :	Albert shi	**Test Voltage :**	+12Vdc

Frequency	20dB BW (kHz)
5735MHz	405.30
5800MHz	412.29
5865MHz	409.80

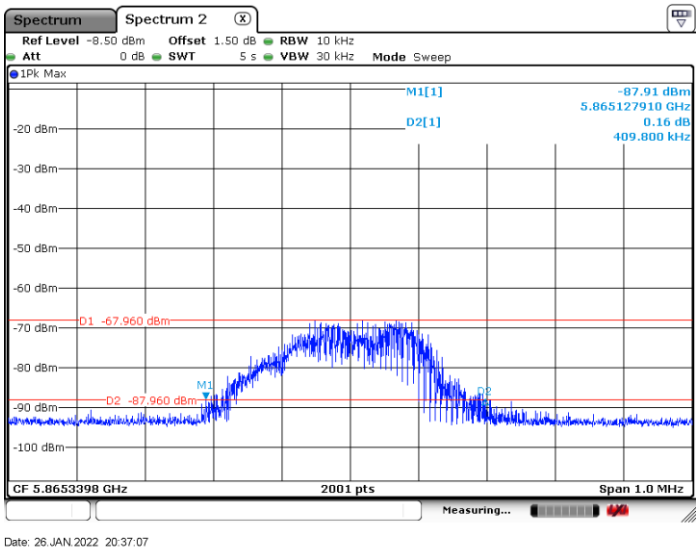
20 dB Bandwidth Plot on 5735MHz



20 dB Bandwidth Plot on 5800MHz



20 dB Bandwidth Plot on 5865MHz



3.2 Field Strength of Fundamental Emissions and Radiated Spurious Emissions

3.2.1 Limit

The field strength measured at 3 meters shall not exceed the limits in the following table:

Fundamental Frequencies(MHz)	Field Strength(millivolts/m)	
	Fundamental	Harmonics
902~928	50	0.5
2400~2483.5	50	0.5
5725~5875	50	0.5

Note: The limits shown in the above table are based on measurements using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using a CISPR quasi-peak detector.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed as below, whichever is less stringent.

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

3.2.2 Measuring Instruments

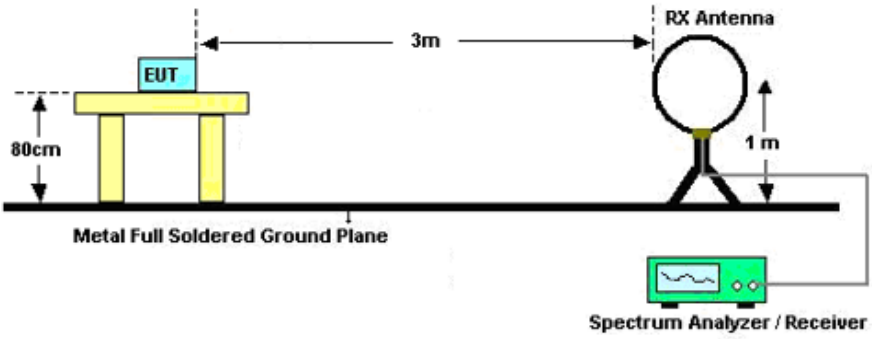
The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.2.3 Test Procedures

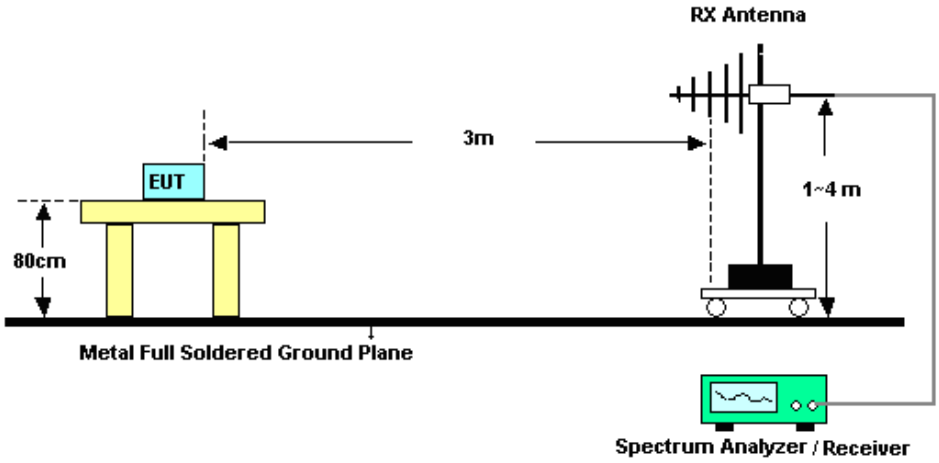
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, 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:
   Span shall wide enough to fully capture the emission being measured;
   Set RBW=120 kHz for f < 1 GHz, RBW=1MHz for f>1GHz; VBW ≥ RBW; Sweep = auto;
   Detector function = peak; Trace = max hold for peak
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4 Test Setup

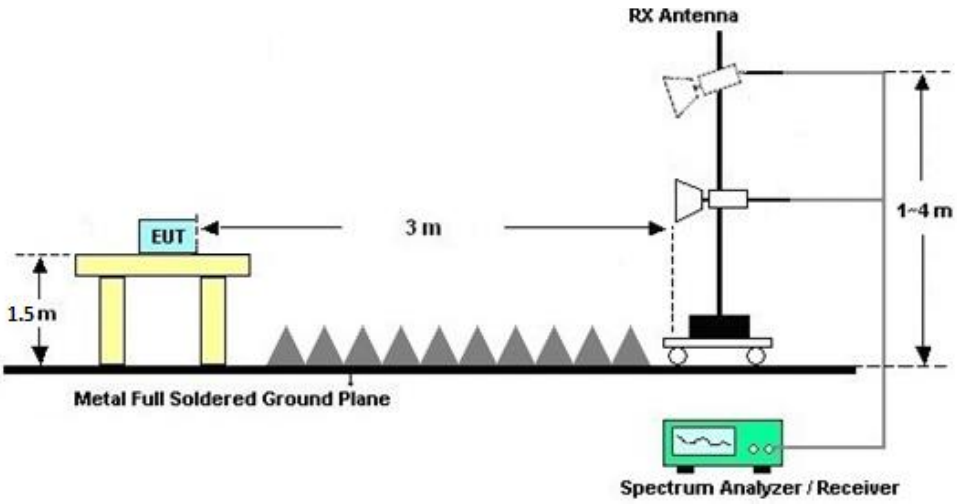
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 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 not reported.

3.2.8 Test Result of Radiated Spurious Emission

Please refer to Appendix A.

3.2.9 Test Result of Radiated Spurious Emission Plots

Please refer to Appendix B.

3.3 Antenna Requirements

3.3.1 Standard Applicable

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Jan. 26, 2022~ Jan. 27, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Jan. 26, 2022~ Jan. 27, 2022	Jul. 11, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 16, 2021	Feb. 21, 2022	Oct. 15, 2022	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 12, 2021	Feb. 21, 2022	Apr. 11, 2022	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Feb. 21, 2022	Oct. 29, 2022	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May 27, 2021	Feb. 21, 2022	May 26, 2022	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 25, 2021	Feb. 21, 2022	Apr. 24, 2022	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 05, 2022	Feb. 21, 2022	Jan. 04, 2023	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 12, 2021	Feb. 21, 2022	Apr. 11, 2022	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	Feb. 21, 2022	Jul. 29, 2022	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 13, 2021	Feb. 21, 2022	Apr. 12, 2022	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Feb. 21, 2022	Jan. 04, 2023	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Feb. 21, 2022	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Feb. 21, 2022	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Feb. 21, 2022	NCR	Radiation (03CH06-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

---------- THE END ----------

Appendix A. Radiated Spurious Emission

Temperature :	22~23℃	**Relative Humidity :**	41~42%
Test Engineer :	Carry Xu	**Test Voltage :**	+12Vdc

Part 15.249 5725~5875MHz

MPS_Tx_5735MHz (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
MPS_Tx_ 5735MHz		5724.98	67.68	-6.32	74	52.85	35.62	11.25	32.04	185	135	P	H
		5717.45	45.6	-8.4	54	30.81	35.6	11.23	32.04	185	135	A	H
		5734	96.42	-17.58	114	81.56	35.62	11.25	32.01	185	135	P	H
		5728	74.5	-19.5	94	59.67	35.62	11.25	32.04	185	135	A	H
		5724.47	64.35	-9.65	74	49.52	35.62	11.25	32.04	197	309	P	V
		5716.1	45.58	-8.42	54	30.79	35.6	11.23	32.04	197	309	A	V
		5734	86.69	-27.31	114	71.83	35.62	11.25	32.01	197	309	P	V
		5728	76.64	-17.36	94	61.81	35.62	11.25	32.04	197	309	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

MPS_Tx_5800MHz (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
MPS_Tx_ 5800MHz		5715.56	58.9	-15.1	74	44.11	35.6	11.23	32.04	196	169	P	H
		5722.04	45.69	-8.31	54	30.88	35.6	11.25	32.04	196	169	A	H
		5905	58.8	-15.2	74	43.56	35.78	11.43	31.97	196	169	P	H
		5910.6	45.9	-8.1	54	30.68	35.78	11.43	31.99	196	169	A	H
		5800	101.27	-12.73	114	86.2	35.72	11.32	31.97	196	169	P	H
		5800	68.41	-25.59	94	53.34	35.72	11.32	31.97	196	169	A	H
		5723.66	58.36	-15.64	74	43.53	35.62	11.25	32.04	181	310	P	V
		5719.07	45.64	-8.36	54	30.83	35.6	11.25	32.04	181	310	A	V
		5899.6	58.47	-15.53	74	43.25	35.78	11.41	31.97	181	310	P	V
		5907.2	45.85	-8.15	54	30.61	35.78	11.43	31.97	181	310	A	V
		5800	96.66	-17.34	114	81.59	35.72	11.32	31.97	181	310	P	V
		5800	70.66	-23.34	94	55.59	35.72	11.32	31.97	181	310	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

MPS_Tx_5865MHz (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
MPS_Tx_ 5865MHz		5875	69.89	-4.11	74	54.66	35.79	11.39	31.95	220	175	P	H
		5912.2	45.85	-8.15	54	30.63	35.78	11.43	31.99	220	175	A	H
		5866	100.23	-13.77	114	85.01	35.79	11.38	31.95	220	175	P	H
		5866	75.23	-18.77	94	60.01	35.79	11.38	31.95	220	175	A	H
		5875	67.52	-6.48	74	52.29	35.79	11.39	31.95	191	311	P	V
		5910.2	45.92	-8.08	54	30.7	35.78	11.43	31.99	191	311	A	V
		5866	89.85	-24.15	114	74.63	35.79	11.38	31.95	191	311	P	V
		5866	63.16	-30.84	94	47.94	35.79	11.38	31.95	191	311	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Part 15.249 5725~5875MHz

MPS_Tx_5735MHz (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
MPS_Tx_ 5735MHz		11470	63.59	-10.41	74	69.05	38.69	16.29	60.44	296	153	P	H
		11470	39.88	-14.12	54	45.34	38.69	16.29	60.44	296	153	A	H
		11470	47.83	-26.17	74	53.29	38.69	16.29	60.44	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

MPS_Tx_5800MHz (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
MPS_Tx_ 5800MHz		11600	61.43	-12.57	74	66.65	38.72	16.42	60.36	304	161	P	H
		11600	40.15	-13.85	54	45.37	38.72	16.42	60.36	304	161	A	H
		11600	50.39	-23.61	74	55.61	38.72	16.42	60.36	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

MPS_Tx_5865MHz (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant. 1		(MHz)	(dBμV/m)	Limit (dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)
MPS_Tx_ 5865MHz		11730	48.55	-25.45	74	53.54	38.74	16.54	60.27	300	0	P	H
		11730	48.19	-25.81	74	53.18	38.74	16.54	60.27	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

Part 15.249 5725~5875MHz(LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Part 15.249 5725~5875MHz LF		59.1	31.38	-8.62	40	48.94	13.01	1.01	31.58	-	-	P	H
		210.42	37.73	-5.77	43.5	50.61	16.11	2.35	31.34	-	-	P	H
		263.77	34.25	-11.75	46	44.32	18.75	2.62	31.44	-	-	P	H
		349.13	39.77	-6.23	46	48	20.39	3.03	31.65	-	-	P	H
		412.18	40.79	-5.21	46	46.78	21.94	3.31	31.24	144	225	P	H
		839.95	31.06	-14.94	46	31.07	26.57	4.72	31.3	-	-	P	H
		58.13	31.25	-8.75	40	48.03	13.72	1	31.5	-	-	P	V
		94.02	24.19	-19.31	43.5	37.74	16.84	1.54	31.93	-	-	P	V
		155.13	20.79	-22.71	43.5	32.72	17.38	2.01	31.32	-	-	P	V
		245.34	23.3	-22.7	46	33.03	19.1	2.53	31.36	-	-	P	V
		349.13	32.32	-13.68	46	39.56	21.38	3.03	31.65	-	-	P	V
		480.08	27.89	-18.11	46	31.49	24.14	3.56	31.3	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix B. Radiated Spurious Emission Plots

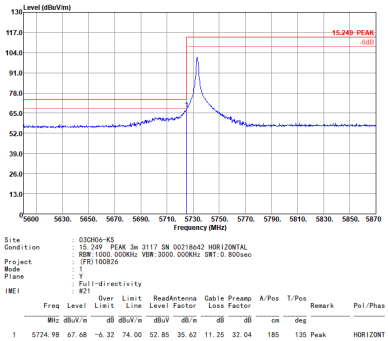
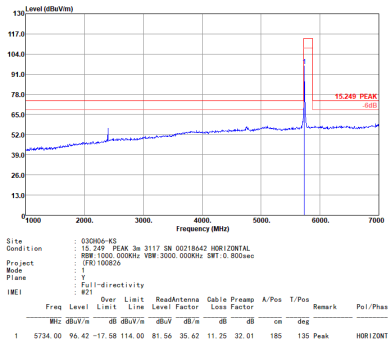
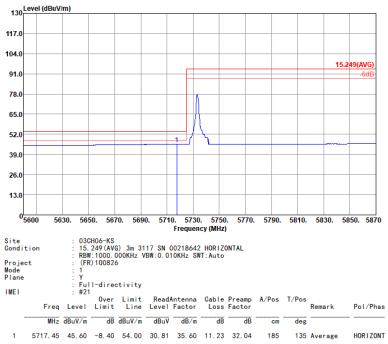
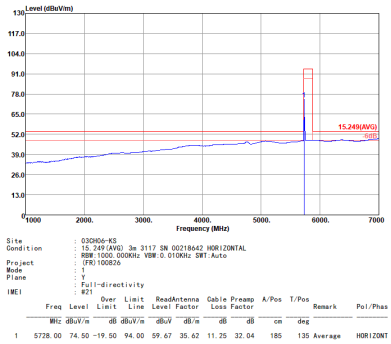
Temperature :	22~23℃	**Relative Humidity :**	41~42%
Test Engineer :	Carry Xu	**Test Voltage :**	+12Vdc

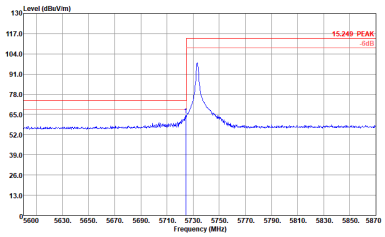
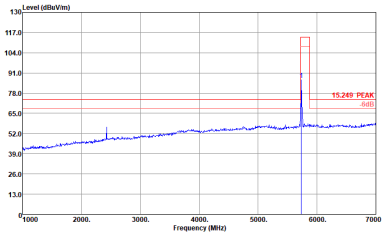
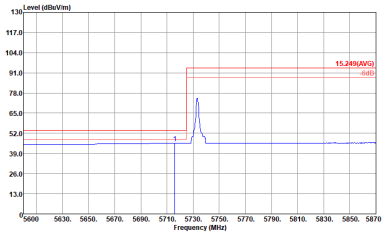
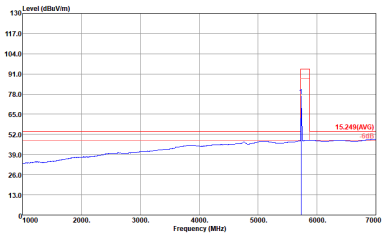
Note symbol

-L	**Low channel location**
-R	**High channel location**

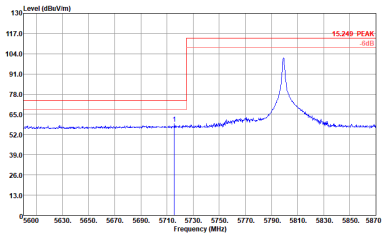
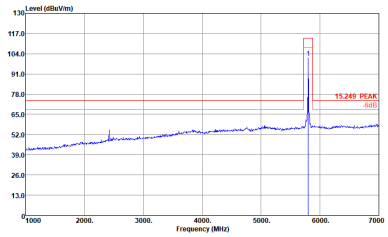
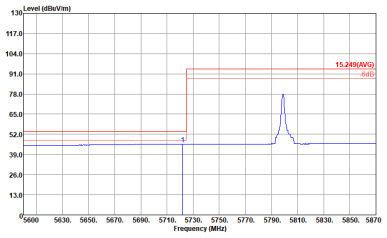
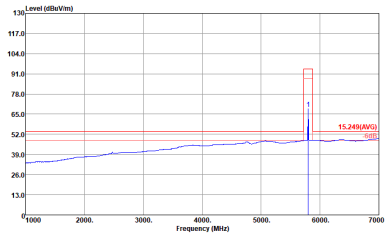
Part 15.249 5725~5875MHz

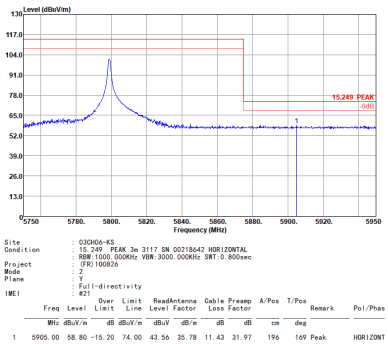
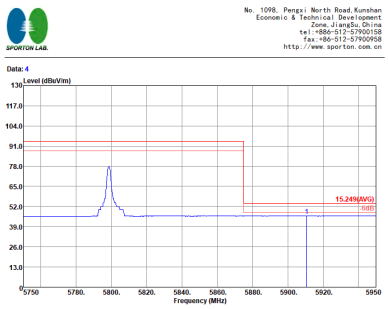
MPS_Tx_5735MHz(Band Edge @ 3m)

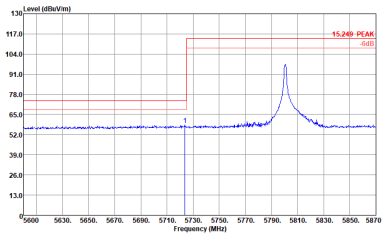
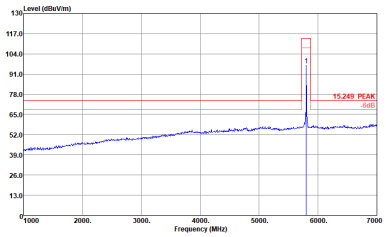
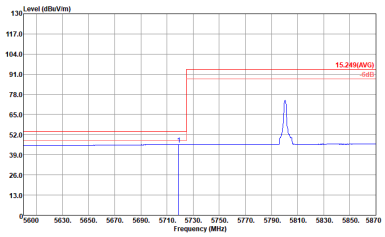
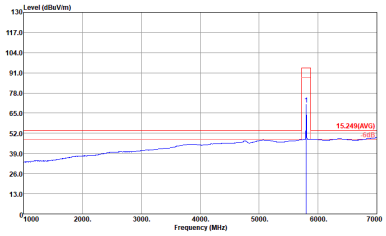
	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5735MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

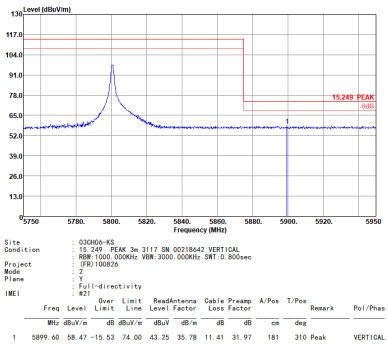
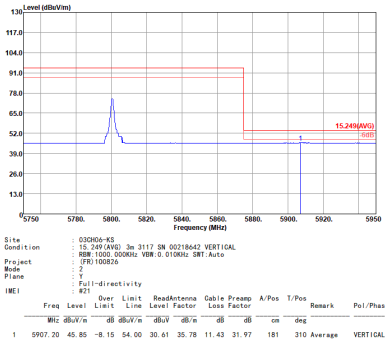
	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5735MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 1 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5724.47 64.35 -9.65 74.00 49.52 35.62 11.25 32.04 197 309 Peak VERTICAL	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 1 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5734.00 86.69 -27.31 114.00 71.83 35.62 11.25 32.01 197 309 Peak VERTICAL
Avg.	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 1 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5716.10 45.58 -8.42 54.00 30.79 35.60 11.23 32.04 197 309 Average VERTICAL	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 1 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5728.00 76.64 -17.36 94.00 61.81 35.62 11.25 32.04 197 309 Average VERTICAL

MPS_Tx_5800MHz(Band Edge @ 3m)

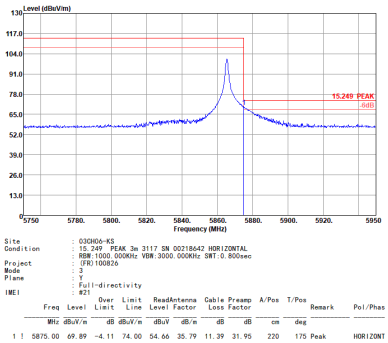
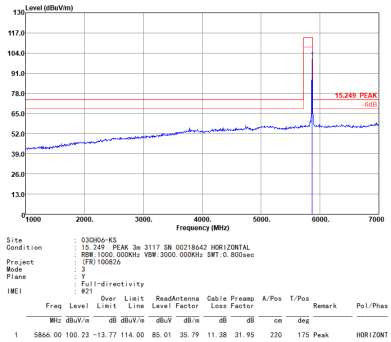
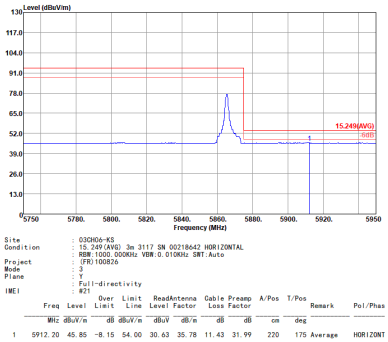
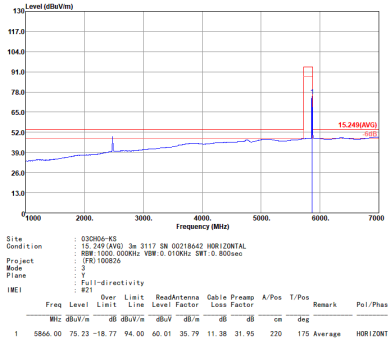
	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5800MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Read Level Antenna Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5715.56 58.90 -15.10 74.00 44.11 35.60 11.23 32.04 196 169 Peak HORIZONT	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Read Level Antenna Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5800.00 101.27 -12.73 114.00 86.20 35.72 11.32 31.97 196 169 Peak HORIZONT
Avg.	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Read Level Antenna Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5722.04 45.69 -8.31 54.00 30.88 35.60 11.25 32.04 196 169 Average HORIZONT	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Read Level Antenna Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5800.00 68.41 -25.59 94.00 53.34 35.72 11.32 31.97 196 169 Average HORIZONT

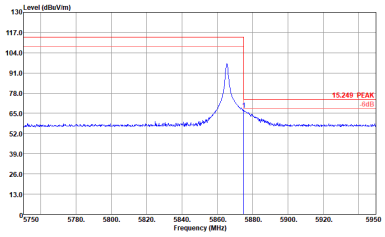
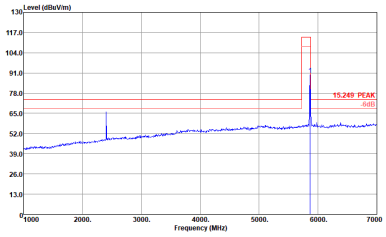
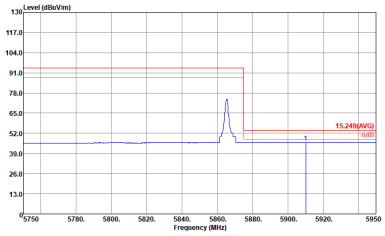
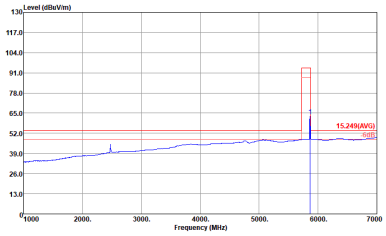
	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5800MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y IMEI : Full-directivity : #21 Freq Level Over Limit Limit Line ReadAntenna Level Cable Factor Preamp Loss Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5905.00 58.80 -15.20 74.00 43.56 35.78 11.43 31.97 196 169 Peak HORIZONT	Left blank
Avg.	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 2 Plane : Y IMEI : Full-directivity : #21 Freq Level Over Limit Limit Line ReadAntenna Level Cable Factor Preamp Loss Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5910.60 45.90 -8.10 54.00 30.68 35.78 11.43 31.99 196 169 Average HORIZONT	Left blank

	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5800MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5723.66 58.36 -15.64 74.00 43.53 35.62 11.25 32.04 181 310 Peak VERTICAL	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5800.00 96.66 -17.34 114.00 81.59 35.72 11.32 31.97 181 310 Peak VERTICAL
Avg.	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5719.07 45.64 -8.36 54.00 30.83 35.60 11.25 32.04 181 310 Average VERTICAL	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5800.00 70.66 -23.34 94.00 55.59 35.72 11.32 31.97 181 310 Average VERTICAL

WIFI	5725~5875MHz Band Edge @ 3m	
	MPS_Tx_5800MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5899.60 58.47 -15.53 74.00 43.25 35.78 11.41 31.97 181 310 Peak VERTICAL	Left Blank
Avg.	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5907.20 45.85 -8.15 54.00 30.61 35.78 11.43 31.97 181 310 Average VERTICAL	Left Blank

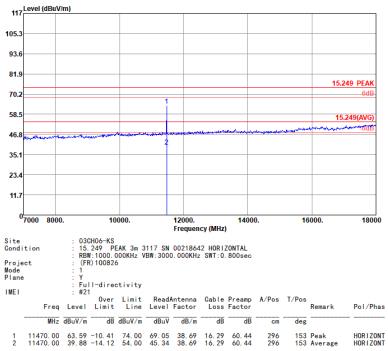
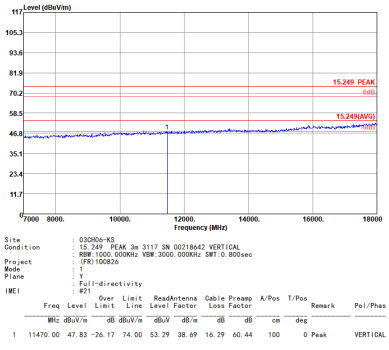
MPS_Tx_5865MHz(Band Edge @ 3m)

	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5865MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

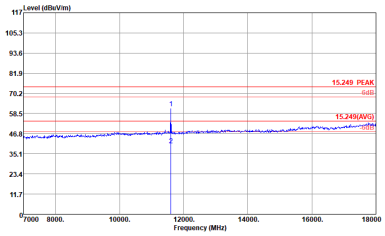
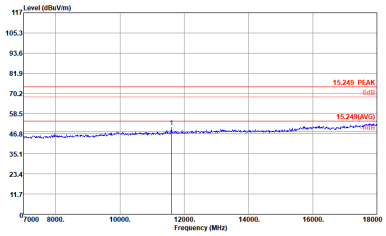
	5725~5875MHz Band Edge @ 3m	
ANT	MPS_Tx_5865MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 3 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5875.00 67.52 -6.48 74.00 52.29 35.79 11.39 31.95 191 311 Peak VERTICAL	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 3 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5866.00 89.85 -24.15 114.00 74.63 35.79 11.38 31.95 191 311 Peak VERTICAL
Avg.	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : (FR)100826 Mode : 3 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5910.20 45.92 -8.08 54.00 30.70 35.78 11.43 31.99 191 311 Average VERTICAL	 Site : 03CH06-KS Condition : 15.249(AVG) 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:0.800sec Project : (FR)100826 Mode : 3 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5866.00 63.16 -30.84 94.00 47.94 35.79 11.38 31.95 191 311 Average VERTICAL

Part 15.249 5725~5875MHz

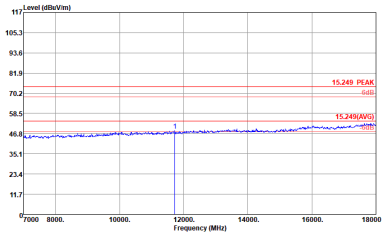
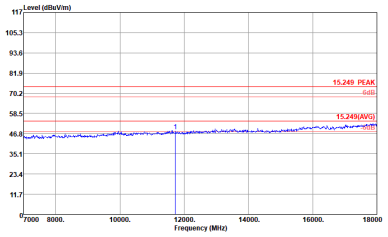
MPS_Tx_5735MHz(Harmonic @ 3m)

	5725~5875MHz Harmonic @ 3m	
ANT	MPS_Tx_5735MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 1 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 11470.00 63.59 -10.41 74.00 69.05 38.69 16.29 60.44 296 153 Peak HORIZONT 2 11470.00 39.88 -14.12 54.00 45.34 38.69 16.29 60.44 296 153 Average HORIZONT	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 1 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 11470.00 47.83 -26.17 74.00 53.29 38.69 16.29 60.44 100 0 Peak VERTICAL

MPS_Tx_5800MHz(Harmonic @ 3m)

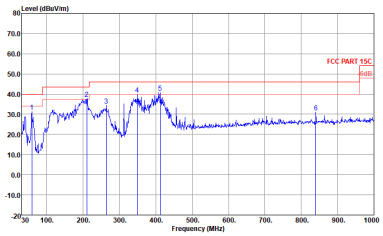
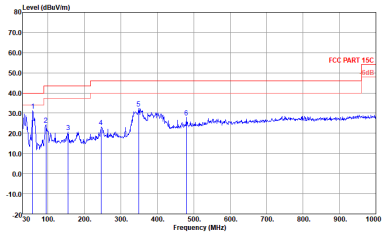
	5725~5875MHz Harmonic @ 3m	
ANT	MPS_Tx_5800MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 11600.00 61.43 -12.57 74.00 66.65 38.72 16.42 60.36 304 161 Peak HORIZONT 2 11600.00 40.15 -13.85 54.00 45.37 38.72 16.42 60.36 304 161 Average HORIZONT	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 2 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 11600.00 50.39 -23.61 74.00 55.61 38.72 16.42 60.36 100 0 Peak VERTICAL

MPS_Tx_5865MHz(Harmonic @ 3m)

	5725~5875MHz Harmonic @ 3m	
ANT	MPS_Tx_5865MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 3 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 11730.00 48.55 -25.45 74.00 53.54 38.74 16.54 60.27 300 0 Peak HORIZONT	 Site : 03CH06-KS Condition : 15.249 PEAK 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:0.800sec Project : (FR)100826 Mode : 3 Plane : Y : Full-directivity IMEI : #21 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 11730.00 48.19 -25.81 74.00 53.18 38.74 16.54 60.27 100 0 Peak VERTICAL

Emission below 1GHz

Part 15.249 5725~5875MHz (LF)

	Part 15.249 5725~5875MHz	
ANT	LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH06-KS Condition : FCC PART 15C 3m GBL6111DSN23188 HORIZONTAL : RBW:100.000KHz VBW:300.000KHz SWT:Auto Project : 100826 Mode : SN : Battery : Freq Level Over Limit Limit Line ReadAntenna Level Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 59.10 31.38 -8.62 40.00 48.94 13.01 1.01 31.58 --- --- Peak HORIZONT 2 ! 210.42 37.73 -5.77 43.50 50.61 16.11 2.35 31.34 --- --- Peak HORIZONT 3 263.77 34.25 -11.75 46.00 44.32 18.75 2.62 31.44 --- --- Peak HORIZONT 4 349.13 39.77 -6.23 46.00 48.00 20.39 3.03 31.65 --- --- Peak HORIZONT 5 ! 412.18 40.79 -5.21 46.00 46.78 21.94 3.31 31.24 144 225 Peak HORIZONT 6 839.95 31.06 -14.94 46.00 31.07 26.57 4.72 31.30 --- --- Peak HORIZONT	 Site : 03CH06-KS Condition : FCC PART 15C 3m GBL6111DSN23188 VERTICAL : RBW:100.000KHz VBW:300.000KHz SWT:Auto Project : 100826 Mode : SN : Battery : Freq Level Over Limit Limit Line ReadAntenna Level Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 58.13 31.25 -8.75 40.00 48.03 13.72 1.00 31.50 --- --- Peak VERTICAL 2 94.02 24.19 -19.31 43.50 37.74 16.84 1.54 31.93 --- --- Peak VERTICAL 3 155.13 20.79 -22.71 43.50 32.72 17.38 2.01 31.32 --- --- Peak VERTICAL 4 245.94 23.30 -22.70 46.00 33.03 19.10 2.53 31.36 --- --- Peak VERTICAL 5 349.13 32.32 -13.68 46.00 39.56 21.38 3.03 31.65 --- --- Peak VERTICAL 6 480.08 27.89 -18.11 46.00 31.49 24.14 3.56 31.30 --- --- Peak VERTICAL