FCC CO-LOCATION RADIO TEST REPORT

FCC ID	**:**	**2AVVJ-5273**
Equipment	**:**	**Digital Media Receiver**
Model Name	**:**	**L4S3RE**
Applicant	**:**	**Coral Creep LLC BROWNSBORO CROSSING 9850 VON ALLMEN COURT, SUITE 201, LOUISVILLE, KENTUCKY, 40241**
Standard	**:**	**FCC Part 15 Subpart E §15.407**

The product was received on Apr. 15, 2020 and testing was started from May 08, 2020 and completed on Jun. 29, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR012305-01I	01	Initial issue of report	Jul. 07, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)
3.1	15.407(b)	Unwanted Emissions	Pass
3.2	15.203 15.407(a)	Antenna Requirement	Pass

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.

Reviewed by: Wii Chang

Report Producer: Dara Chiu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Digital Media Receiver
Model Name	L4S3RE
FCC ID	2AVVJ-5273
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE Zigbee/FSK/LoRa

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	Zigbee: 2405 MHz ~ 2475 MHz LoRa DTS: 902.5 MHz ~ 926.5 MHz Bluetooth-LE: 2402 MHz ~ 2480 MHz 802.11b: 2412 MHz ~ 2472 MHz 802.11a : 5745 MHz ~ 5825 MHz
Antenna Gain / Gain	Zigbee: Flex PIFA Antenna with gain 4.99 dBi LoRa DTS: PIFA Antenna with gain 2.92 dBi Bluetooth-LE: Flex PIFA Antenna with gain 5.22 dBi **<2412 MHz ~ 2472 MHz>** **<Ant. 1>:** PCB PIFA Antenna with gain 3.71 dBi **<Ant. 2>:** PCB PIFA Antenna with gain 3.03 dBi **<5745 MHz ~ 5825 MHz>** **<Ant. 1>:** PCB PIFA Antenna with gain 4.08 dBi **<Ant. 2>:** PCB PIFA Antenna with gain 3.26 dBi
Type of Modulation	Zigbee: OQPSK LoRa DTS: LoRa Bluetooth-LE: GFSK 802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.3 Modification of EUT

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

1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH11-HY

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

FCC designation No.: TW0007

1.5 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- 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. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

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).

2.1 Carrier Frequency and Channel

2405-2480 MHz Zigbee		902.5 MHz ~ 926.5 MHz LoRa DTS	
Channel	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**
11	2405	16	914.5

2400-2483.5 MHz Bluetooth-LE (2Mbps)	
Channel	**Freq. (MHz)**
0	2402
1	2404
19	2440

2400-2483.5 MHz 802.11b		5725-5850 MHz 802.11a	
Channel	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**
8	2447	149	5745

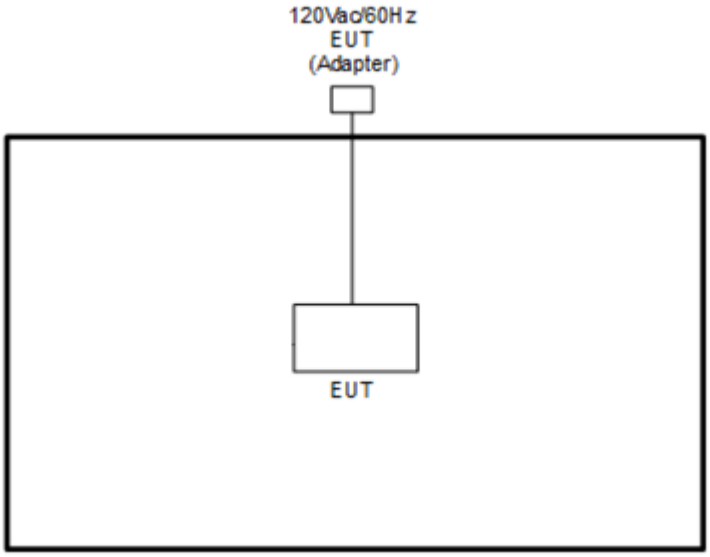
2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

<Co-Location>

Modulation	Data Rate
Bluetooth - LE for Ant. 3 + 2.4GHz 802.11b for Ant. 1+2 + LoRa (DTS) for Ant. 4	**2Mbps + 1Mbps +500kHz**
Bluetooth - LE for Ant. 3 + 5GHz 802.11a for Ant. 1+2 + LoRa (DTS) for Ant. 4	**2Mbps + 6Mbps + 500kHz**
Bluetooth - LE for Ant. 3 + Zigbee for Ant. 4 + LoRa (DTS) for Ant. 4	**2Mbps + 250kHz + 500kHz**

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

The RF test items, utility “Compliance_v1.0.0.79” was installed in Notebook which was programmed in order to 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.

3 Test Result

3.1 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.1.1 Limit of Unwanted Emissions

(1) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

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

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

(3) KDB789033 D02 v02r01 G)2)c)

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of −27 dBm/MHz.

(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

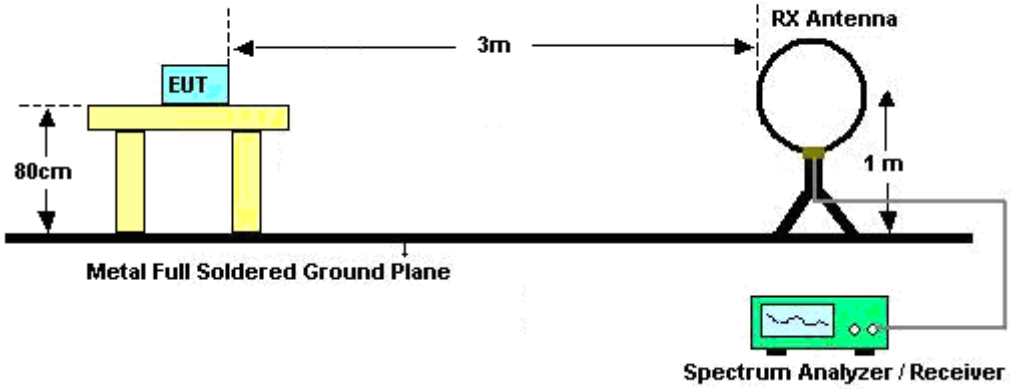
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

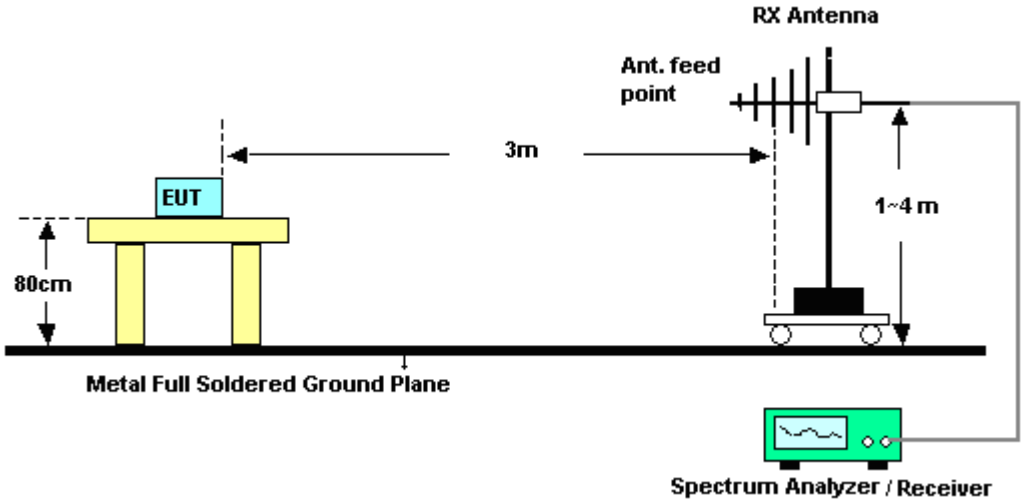
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.1.4 Test Setup

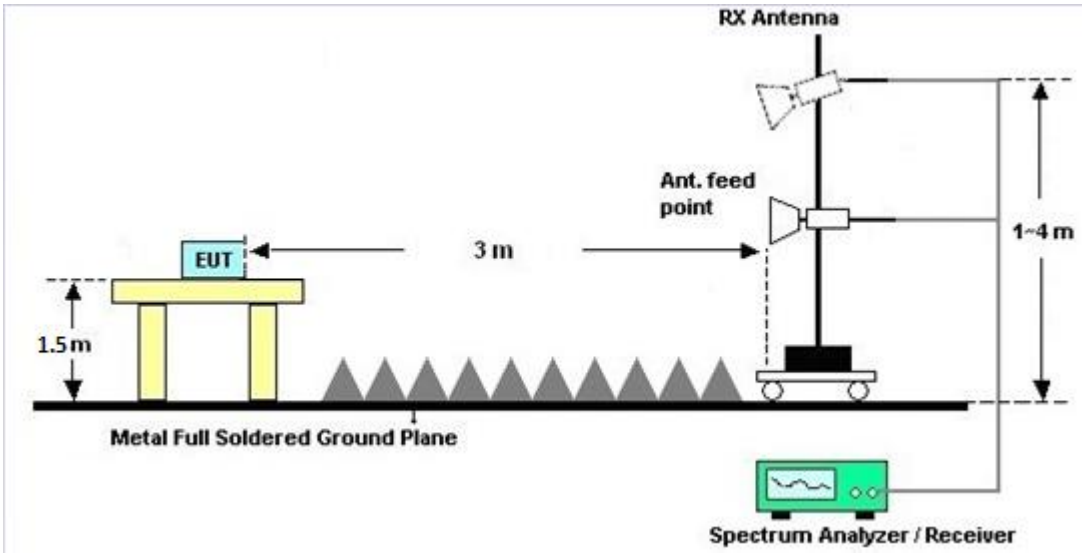
For radiated emissions below 30MHz



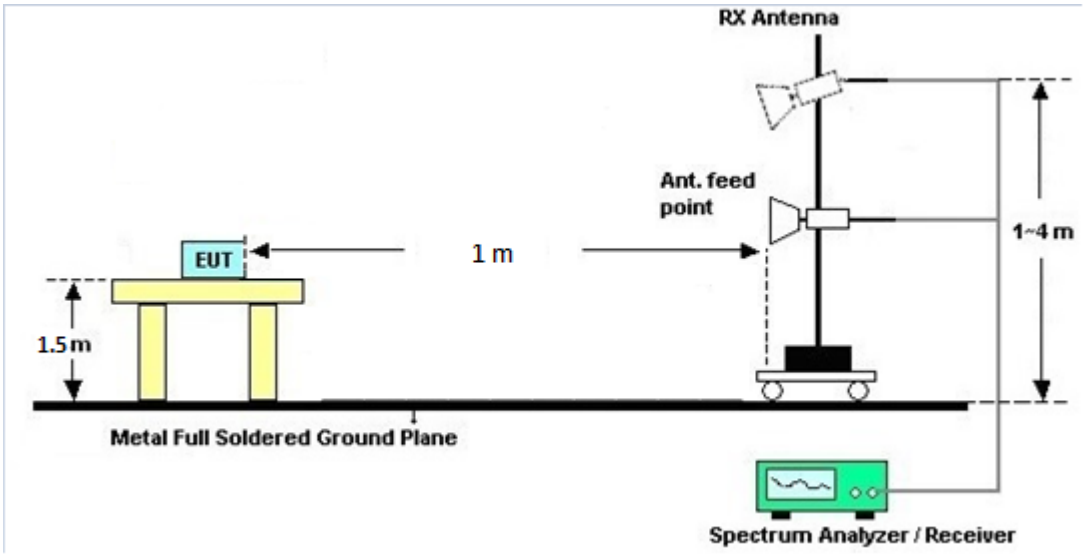
For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



For radiated emissions above 18GHz



3.1.5 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 was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

3.1.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix A and B.

3.2 Antenna Requirements

3.2.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 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
Preamplifier	EMCE	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Jun. 29, 2020	Dec. 12, 2020	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 03, 2019	May 08, 2020~ Jun. 29, 2020	Dec. 02, 2020	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 12, 2019	May 08, 2020~ Jun. 29, 2020	Oct. 11, 2020	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Nov. 04, 2019	May 08, 2020~ Jun. 29, 2020	Nov. 03, 2020	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Dec. 26, 2019	May 08, 2020~ Jun. 29, 2020	Dec. 25, 2020	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 13, 2019	May 08, 2020~ Jun. 29, 2020	Nov. 12, 2020	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Oct. 28, 2019	May 08, 2020~ Jun. 29, 2020	Oct. 27, 2020	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	May 08, 2020~ Jun. 29, 2020	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	May 08, 2020~ Jun. 29, 2020	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	May 08, 2020~ Jun. 29, 2020	N/A	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-303K	1710001800054002	1GHz~18GHz	Aug. 06, 2019	May 08, 2020~ Jun. 29, 2020	Aug. 05, 2020	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz- 40GHz	May. 22, 2020	Jun. 29, 2020	May. 21, 2021	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 28, 2019	May 08, 2020~ Jun. 29, 2020	Oct. 27, 2020	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	May 08, 2020~ Jun. 29, 2020	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz-30MHz	Mar. 12, 2020	May 08, 2020~ Jun. 29, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 12, 2020	May 08, 2020~ Jun. 29, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	30M-18G	Mar. 12, 2020	May 08, 2020~ Jun. 29, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 12, 2020	May 08, 2020~ Jun. 29, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN11	1.53G Low Pass	Sep. 15, 2019	May 08, 2020~ Jun. 29, 2020	Sep. 14, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN3	3GHz High Pass Filter	Sep. 15, 2019	May 08, 2020~ Jun. 29, 2020	Sep. 14, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-935-1000-15000-40ST	SN1	1GHz High Pass Filter	Apr. 30, 2020	May 08, 2020~ Jun. 29, 2020	Apr. 29, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40SS	SN3	6.75GHz High Pass Filter	Sep. 16, 2019	May 08, 2020~ Jun. 29, 2020	Sep. 15, 2020	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP140325	N/A	Nov. 07, 2019	May 08, 2020~ Jun. 29, 2020	Nov. 06, 2020	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP161237	N/A	Oct. 25, 2019	May 08, 2020~ Jun. 29, 2020	Oct. 24, 2020	Radiation (03CH11-HY)

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))	**5.2**

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.3**

Appendix A. Radiated Spurious Emission

Test Engineer :	Cookie Ku, Fu Chen and Troye Hsieh	Temperature :	19.1~26.3°C
		Relative Humidity :	50.2~69.1%

2.4GHz 2400~2483.5MHz (Band Edge @ 3m)

Ant. Simultaneously	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)
Mode 1 Ant. 1+2 11b Ch08 + Ant. 3 BLE(2M) Ch01 + Ant. 4 LoRa (DTS) 500kHz Ch16		2380.24	53.64	-20.36	74	42.73	27.54	16.61	33.24	100	114	P	H
		2390	42.79	-11.21	54	31.88	27.52	16.62	33.23	100	114	A	H
	*	2447	112.56	-	-	101.69	27.41	16.68	33.22	100	114	P	H
	*	2447	109.55	-	-	98.68	27.41	16.68	33.22	100	114	A	H
		2490.24	55.25	-18.75	74	44.49	27.24	16.73	33.21	100	114	P	H
		2489.92	44.57	-9.43	54	33.81	27.24	16.73	33.21	100	114	A	H
		2345.68	53.69	-20.31	74	42.74	27.61	16.58	33.24	103	243	P	V
		2390	42.32	-11.68	54	31.41	27.52	16.62	33.23	103	243	A	V
	*	2447	111.28	-	-	100.41	27.41	16.68	33.22	103	243	P	V
	*	2447	108.33	-	-	97.46	27.41	16.68	33.22	103	243	A	V
		2490.56	55.32	-18.68	74	44.56	27.24	16.73	33.21	103	243	P	V
		2490	46.15	-7.85	54	35.39	27.24	16.73	33.21	103	243	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

BLE (Band Edge @ 3m)

Ant. Simultaneously	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)
Mode 1 Ant. 1+2 11b Ch08 + Ant. 3 BLE(2M) Ch01 + Ant. 4 LoRa (DTS) 500kHz Ch16		2322.8	53.41	-20.59	74	42.46	27.65	16.55	33.25	110	316	P	H
		2327.76	42.64	-11.36	54	31.69	27.64	16.56	33.25	110	316	A	H
	*	2404	103.57	-	-	92.68	27.49	16.63	33.23	110	316	P	H
	*	2404	101.81	-	-	90.92	27.49	16.63	33.23	110	316	A	H
		2496.88	52.32	-21.68	74	41.58	27.21	16.74	33.21	110	316	P	H
		2489.92	43.59	-10.41	54	32.83	27.24	16.73	33.21	110	316	A	H
		2352.4	52.2	-21.8	74	41.26	27.6	16.58	33.24	113	336	P	V
		2389.04	43.1	-10.9	54	32.19	27.52	16.62	33.23	113	336	A	V
	*	2404	101.82	-	-	90.93	27.49	16.63	33.23	113	336	P	V
	*	2404	100.24	-	-	89.35	27.49	16.63	33.23	113	336	A	V
		2488.8	52.95	-21.05	74	42.19	27.24	16.73	33.21	113	336	P	V
		2489.84	43.69	-10.31	54	32.93	27.24	16.73	33.21	113	336	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz ((Harmonic @ 3m)

Ant. Simultaneously	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)
Mode 1 Ant. 1+2 11b Ch08 + Ant. 3 BLE(2M) Ch01 + Ant. 4 LoRa (DTS) 500kHz Ch16		2490	57.02	-16.98	74	45.79	27.24	6.8	33.21	111	137	P	H
		2490	48.52	-5.48	54	37.29	27.24	6.8	33.21	111	137	A	H
		2743.5	45.3	-28.7	74	43.02	27.6	7.75	33.07	100	0	P	H
		3658	39.77	-34.23	74	62.7	29.08	9.67	61.68	100	0	P	H
		4808	41.42	-32.58	74	59.94	31	10.93	60.45	100	0	P	H
		4894	44.69	-29.31	74	63.09	31	10.98	60.38	100	0	P	H
		7341	45.13	-28.87	74	54.42	36.5	13.31	59.1	100	0	P	H
		2490	58.91	-15.09	74	47.68	27.24	6.8	33.21	117	255	P	V
		2490	50.8	-3.2	54	39.57	27.24	6.8	33.21	117	255	A	V
		2743.5	45.01	-28.99	74	42.73	27.6	7.75	33.07	100	0	P	V
		3658	39.92	-34.08	74	62.85	29.08	9.67	61.68	100	0	P	V
		4808	41.49	-32.51	74	60.01	31	10.93	60.45	100	0	P	V
		4894	41.41	-32.59	74	59.81	31	10.98	60.38	100	0	P	V
		7341	45.47	-28.53	74	54.76	36.5	13.31	59.1	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

5GHz 5725~5850MHz (Band Edge @ 3m)

Ant. Simultaneously	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)
Mode 2 Ant. 1+2 11a Ch149 + Ant. 3 BLE(2M) Ch00 + Ant. 4 LoRa (DTS) 500kHz Ch16		5635.4	51.94	-16.26	68.2	42.28	31.83	10.38	32.55	111	299	P	H
		5699.6	53.35	-51.56	104.91	43.33	32.1	10.45	32.53	111	299	P	H
		5714.4	64.36	-44.87	109.23	54.29	32.13	10.47	32.53	111	299	P	H
		5724.2	71.94	-48.44	120.38	61.84	32.15	10.48	32.53	111	299	P	H
	*	5745	113.28	-	-	103.11	32.19	10.5	32.52	111	299	P	H
	*	5745	106.38	-	-	96.21	32.19	10.5	32.52	111	299	A	H
		5620.4	52.23	-15.97	68.2	42.57	31.86	10.36	32.56	100	146	P	V
		5699.8	54.71	-50.34	105.05	44.69	32.1	10.45	32.53	100	146	P	V
		5719.4	64.95	-45.68	110.63	54.87	32.14	10.47	32.53	100	146	P	V
		5725	69.17	-53.03	122.2	59.07	32.15	10.48	32.53	100	146	P	V
	*	5745	110.68	-	-	100.51	32.19	10.5	32.52	100	146	P	V
	*	5745	104.19	-	-	94.02	32.19	10.5	32.52	100	146	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

BLE (Band Edge @ 3m)

Ant. Simultaneously	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)
Mode 2 Ant. 1+2 11a Ch149 + Ant. 3 BLE(2M) Ch00 + Ant. 4 LoRa (DTS) 500kHz Ch16		2373.525	52.8	-21.2	74	41.89	27.55	16.6	33.24	110	303	P	H
		2353.995	42.86	-11.14	54	31.93	27.59	16.58	33.24	110	303	A	H
	*	2402	104.01	-	-	93.11	27.5	16.63	33.23	110	303	P	H
	*	2402	102.18	-	-	91.28	27.5	16.63	33.23	110	303	A	H
		2370.48	52.48	-21.52	74	41.56	27.56	16.6	33.24	119	336	P	V
		2379.72	42.77	-11.23	54	31.86	27.54	16.61	33.24	119	336	A	V
	*	2402	102.01	-	-	91.11	27.5	16.63	33.23	119	336	P	V
	*	2402	100.23	-	-	89.33	27.5	16.63	33.23	119	336	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz, Band 4 5725~5850MHz ((Harmonic @ 3m)

Ant. Simultaneously	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)
Mode 2 Ant. 1+2 11a Ch149 + Ant. 3 BLE(2M) Ch00 + Ant. 4 LoRa (DTS) 500kHz Ch16		2743.5	45.28	-28.72	74	43	27.6	7.75	33.07	100	0	P	H
		3658	48.81	-25.19	74	42.72	29.08	10	32.99	100	0	P	H
		4804	51.77	-22.23	74	42.2	31	11.31	32.74	100	0	P	H
		4804	42.07	-11.93	54	32.5	31	11.31	32.74	100	0	A	H
		11490	49.52	-24.48	74	54.19	39.61	18.03	62.31	100	0	P	H
		17235	48.14	-20.06	68.2	43.57	40.17	22.88	58.48	100	0	P	H
		2743.5	47.14	-26.86	74	44.86	27.6	7.75	33.07	100	0	P	V
		3658	49.41	-24.59	74	43.32	29.08	10	32.99	100	0	P	V
		4804	53.07	-20.93	74	43.5	31	11.31	32.74	100	0	P	V
		4804	42.37	-11.63	54	32.8	31	11.31	32.74	100	0	A	V
		11490	49.03	-24.97	74	53.7	39.61	18.03	62.31	100	0	P	V
		17235	48.49	-19.71	68.2	43.92	40.17	22.88	58.48	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

BLE (Band Edge @ 3m)

Ant. Simultaneously	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)
Mode 3 Ant. 4 Zigbee Ch11 + Ant. 3 BLE(2M) Ch19 + Ant. 4 LoRa (DTS) 500kHz Ch16		2389.84	56.21	-17.79	74	45.3	27.52	16.62	33.23	100	304	P	H
		2363.12	45.31	-8.69	54	34.39	27.57	16.59	33.24	100	304	A	H
	*	2440	104.29	-	-	93.42	27.42	16.67	33.22	100	304	P	H
	*	2440	102.51	-	-	91.64	27.42	16.67	33.22	100	304	P	H
		2489.68	53.01	-20.99	74	42.25	27.24	16.73	33.21	100	304	P	H
		2498.4	42.9	-11.1	54	32.16	27.21	16.74	33.21	100	304	A	H
		2389.84	55.47	-18.53	74	44.56	27.52	16.62	33.23	100	322	P	V
		2390	46.41	-7.59	54	35.5	27.52	16.62	33.23	100	322	A	V
	*	2440	101.35	-	-	90.48	27.42	16.67	33.22	100	322	P	V
	*	2440	99.81	-	-	88.94	27.42	16.67	33.22	100	322	P	V
		2492.56	53.21	-20.79	74	42.46	27.23	16.73	33.21	100	322	P	V
		2484	43.05	-10.95	54	32.28	27.26	16.72	33.21	100	322	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Zigbee (Band Edge @ 3m)

Ant. Simultaneously	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)
Mode 3 Ant. 4 Zigbee Ch11 + Ant. 3 BLE(2M) Ch19 + Ant. 4 LoRa (DTS) 500kHz Ch16		2389.68	57.68	-16.32	74	46.77	27.52	16.62	33.23	300	2	P	H
		2390	49.99	-4.01	54	39.08	27.52	16.62	33.23	300	2	A	H
	*	2405	109.52	-	-	98.62	27.49	16.64	33.23	300	2	P	H
	*	2405	107.7	-	-	96.8	27.49	16.64	33.23	300	2	A	H
		2492.96	53.26	-20.74	74	42.51	27.23	16.73	33.21	300	2	P	H
		2498.24	43.31	-10.69	54	32.57	27.21	16.74	33.21	300	2	A	H
		2388.88	57.21	-16.79	74	46.3	27.52	16.62	33.23	150	358	P	V
		2390	49.34	-4.66	54	38.43	27.52	16.62	33.23	150	358	A	V
	*	2405	109.16	-	-	98.26	27.49	16.64	33.23	150	358	P	V
	*	2405	107.29	-	-	96.39	27.49	16.64	33.23	150	358	A	V
		2487.36	53.71	-20.29	74	42.94	27.25	16.73	33.21	150	358	P	V
		2485.04	43.01	-10.99	54	32.24	27.26	16.72	33.21	150	358	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz ((Harmonic @ 3m)

Ant. Simultaneously	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)
Mode 3 Ant. 4 Zigbee Ch11 + Ant. 3 BLE(2M) Ch19 + Ant. 4 LoRa (DTS) 500kHz Ch16		2370	55.38	-18.62	74	44.01	27.56	6.67	33.24	350	6	P	H
		2370	46	-8	54	34.63	27.56	6.67	33.24	350	6	A	H
		2743.5	47.75	-26.25	74	45.47	27.6	7.75	33.07	100	0	P	H
		3658	40.32	-33.68	74	63.25	29.08	9.67	61.68	100	0	P	H
		4810	41.14	-32.86	74	59.65	31	10.94	60.45	100	0	P	H
		4880	42	-32	74	60.43	31	10.97	60.4	100	0	P	H
		7320	45.15	-28.85	74	54.4	36.5	13.36	59.11	100	0	P	H
		2370	56.95	-17.05	74	45.58	27.56	6.67	33.24	150	339	P	V
		2370	47.45	-6.55	54	36.08	27.56	6.67	33.24	150	339	A	V
		2743.5	48.54	-25.46	74	46.26	27.6	7.75	33.07	100	0	P	V
		3658	43.89	-30.11	74	62.4	31	10.94	60.45	100	0	P	V
		4810	40.98	-33.02	74	59.49	31	10.94	60.45	100	0	P	V
		4880	41.33	-32.67	74	59.76	31	10.97	60.4	100	0	P	V
		7320	44.66	-29.34	74	53.91	36.5	13.36	59.11	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission above 18GHz

2.4GHz 2400~2483.5MHz (SHF)

	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Mode 1 Ant. 1+2 11b Ch08 + Ant. 3		24209	41.66	-32.34	74	46.59	39.19	9.26	53.38	100	0	P	H
BLE(2M) Ch01 + Ant. 4 LoRa (DTS) 500kHz Ch16		24860	41.57	-32.43	74	45.87	39.74	9.46	53.5	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz 2400~2483.5MHz (LF)

	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Mode 1 Ant. 1+2 11b Ch08 + Ant. 3 BLE(2M) Ch01 + Ant. 4 LoRa (DTS) 500kHz Ch16		71.71	29.98	-10.02	40	39.19	12.16	11.1	32.47	-	-	P	H
		86.26	30.72	-9.28	40	37.85	14.05	11.24	32.42	-	-	P	H
		99.84	29.8	-13.7	43.5	35.21	15.66	11.31	32.38	-	-	P	H
		247.28	32.54	-13.46	46	35.54	17.19	12.22	32.41	-	-	P	H
		561.56	35.46	-10.54	46	28.85	25.91	13.33	32.63	-	-	P	H
		799.21	39.18	-6.82	46	29.35	28.04	13.95	32.16	-	-	P	H
		914.64	113.8	67.8	46	102.19	28.89	14.26	31.54	386	136	P	H
		42.61	33.64	-6.36	40	37.4	17.91	10.82	32.49	-	-	P	V
		84.32	33.09	-6.91	40	40.61	13.69	11.22	32.43	-	-	P	V
		123.12	27.59	-15.91	43.5	31.33	17.28	11.41	32.43	-	-	P	V
		636.25	36.91	-9.09	46	29.48	26.19	13.53	32.29	-	-	P	V
		783.69	38.71	-7.29	46	28.91	27.98	13.93	32.11	-	-	P	V
		851.59	39.88	-6.12	46	28.85	28.83	14.14	31.94	-	-	P	V
		914.64	114.91	68.91	46	103.3	28.89	14.26	31.54	209	178	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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:

Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
Simultaneously		(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".

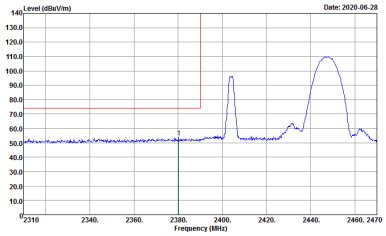
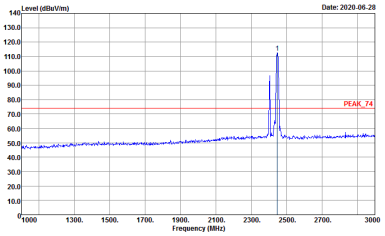
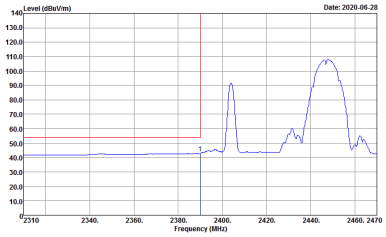
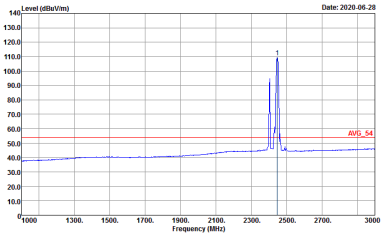
Appendix B. Radiated Spurious Emission Plots

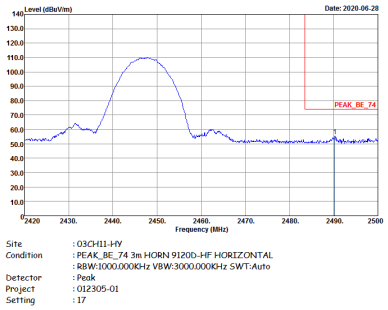
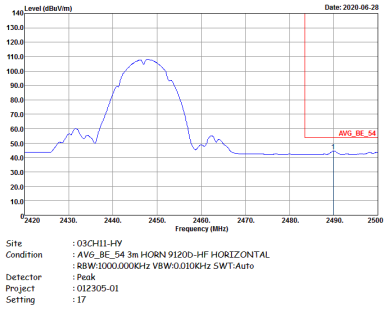
Test Engineer :	Cookie Ku, Fu Chen and Troye Hsieh	**Temperature :**	19.1~26.3°C
		Relative Humidity :	50.2~69.1%

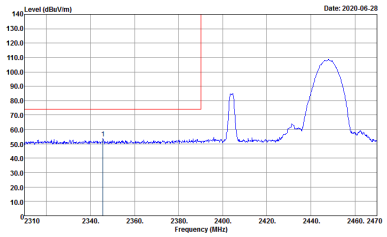
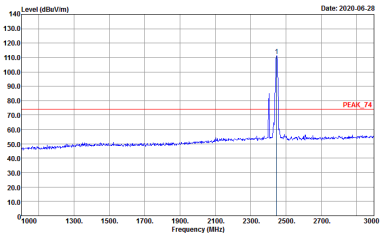
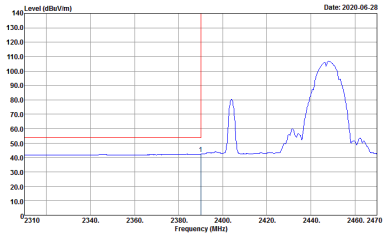
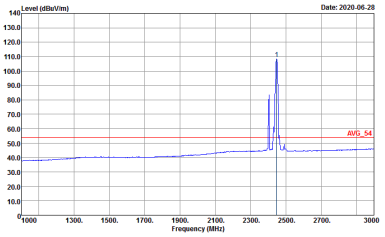
Note symbol

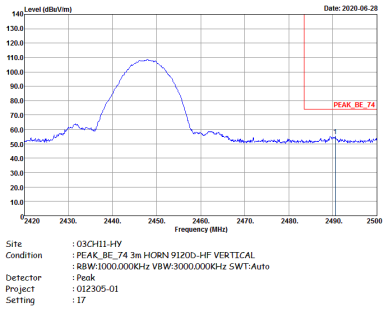
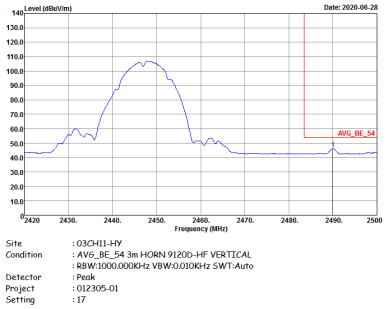
-L	**Low channel location**
-R	**High channel location**

2.4GHz 2400~2483.5MHz (Band Edge @ 3m)

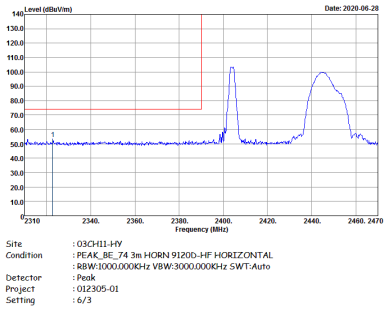
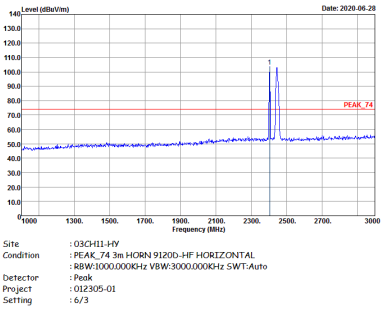
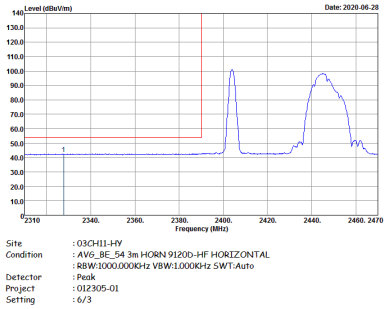
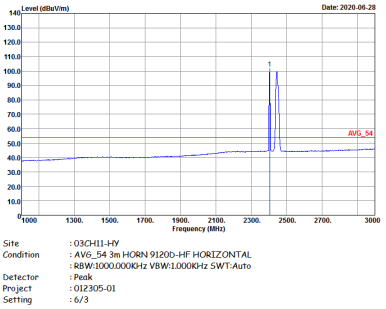
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Horizontal	Fundamental
Peak		
Avg.		

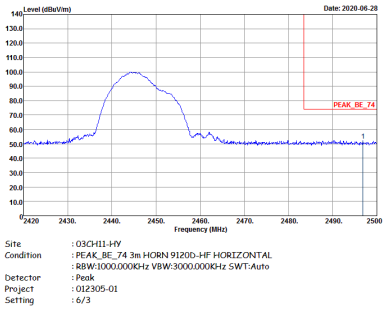
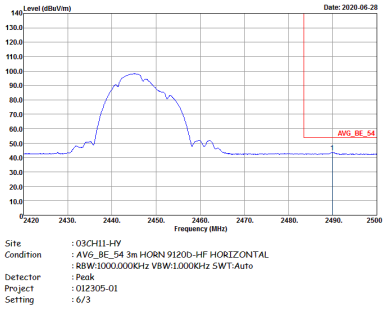
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Horizontal**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

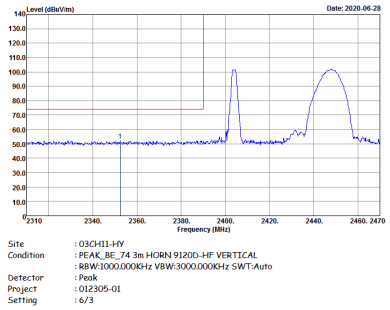
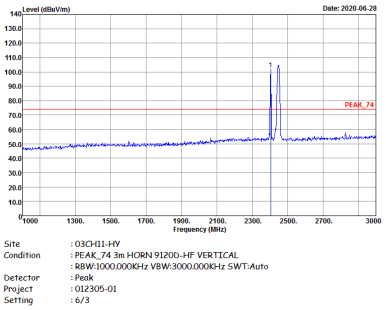
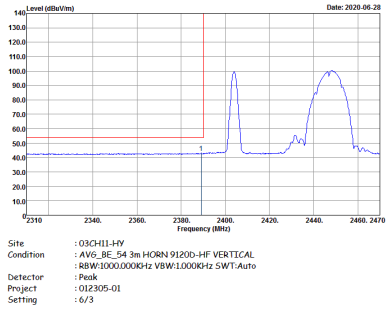
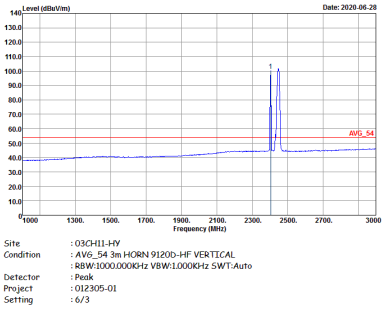
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Vertical	Fundamental
Peak	 Site : 03CH11-HV Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 17	 Site : 03CH11-HV Condition : PEAK_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 17
Avg.	 Site : 03CH11-HV Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 17	 Site : 03CH11-HV Condition : AVG_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 17

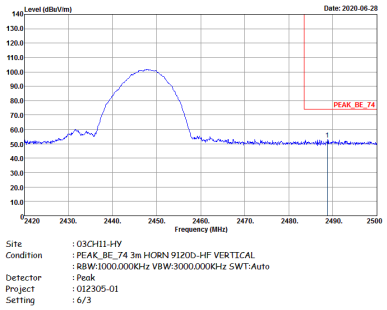
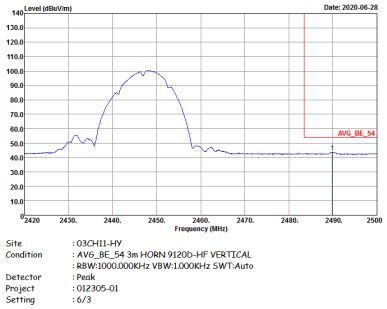
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Vertical**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

BLE (Band Edge @ 3m)

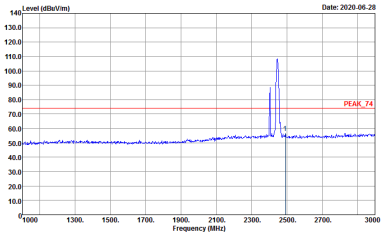
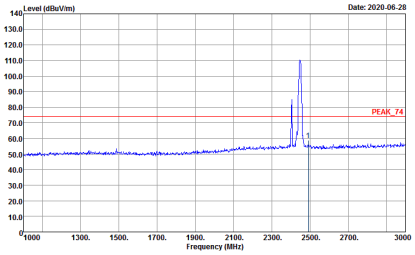
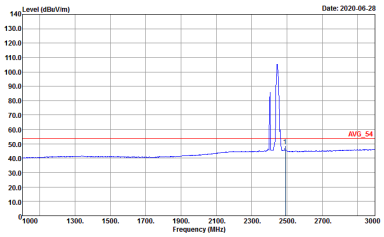
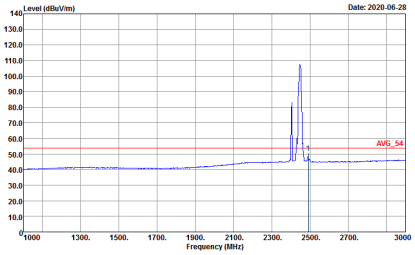
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Horizontal	Fundamental
Peak		
Avg.		

ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Horizontal**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

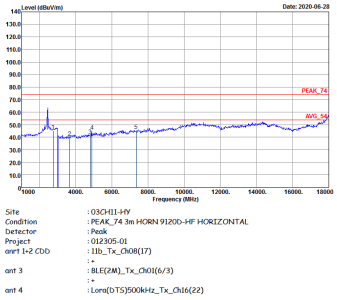
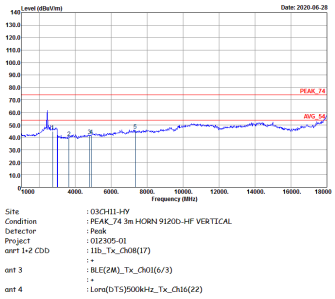
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Vertical	Fundamental
Peak		
Avg.		

ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Vertical**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

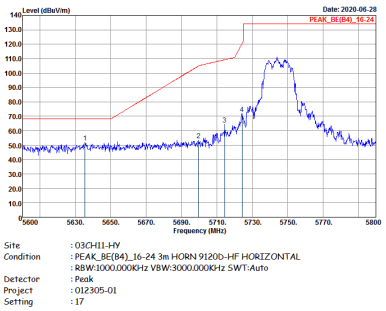
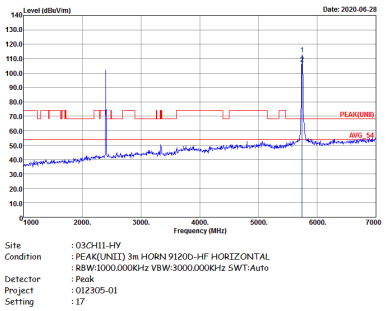
2.4GHz 2400~2483.5MHz (Harmonic @ 3m)

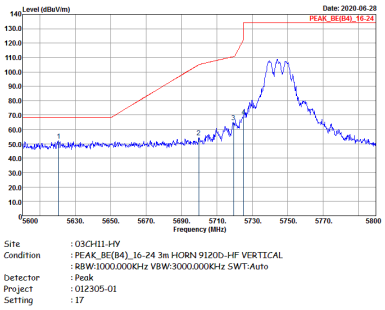
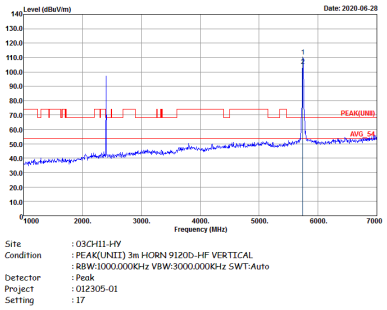
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
Peak	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 1+2 CDD : 11b_Tx_Ch08(17)(2倍頻) : - ant 3 : BLE(2M)_Tx_Ch01(6/3)(主頻)	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 1+2 CDD : 11b_Tx_Ch08(17)(2倍頻) : - ant 3 : BLE(2M)_Tx_Ch01(6/3)(主頻)
Avg.	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 1+2 CDD : 11b_Tx_Ch08(17)(2倍頻) : - ant 3 : BLE(2M)_Tx_Ch01(6/3)(主頻)	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 1+2 CDD : 11b_Tx_Ch08(17)(2倍頻) : - ant 3 : BLE(2M)_Tx_Ch01(6/3)(主頻)

2.4GHz 2400~2483.5MHz (Harmonic @ 3m)

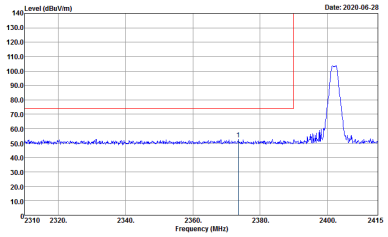
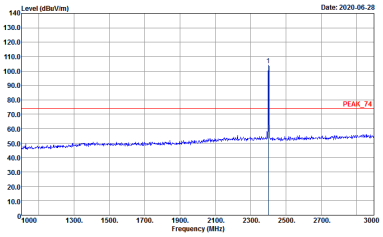
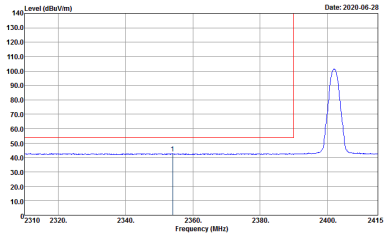
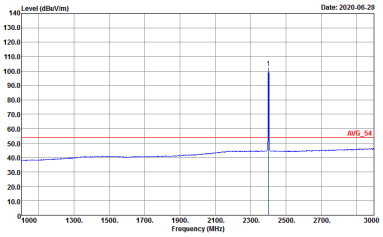
ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
Peak Avg.		

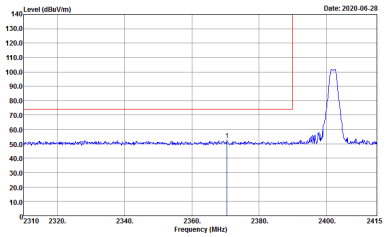
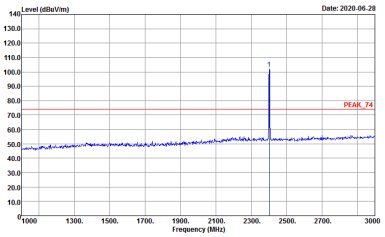
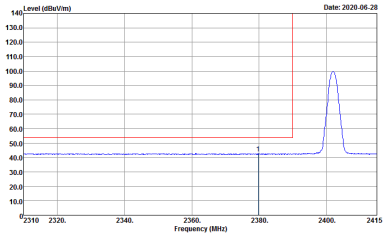
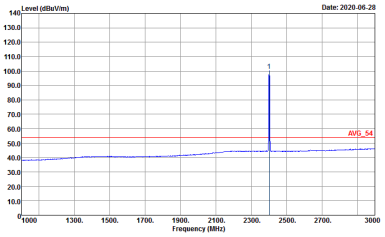
5GHz 5725~5850MHz (Band Edge @ 3m)

ANT	Mode 2: Ant 1+2 11a Ch149 + Ant 3 BLE(2M) Ch00 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Fundamental
Peak		

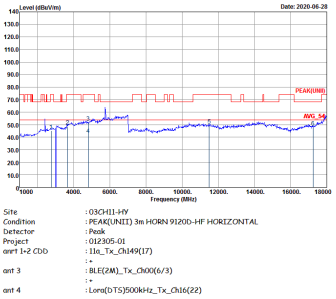
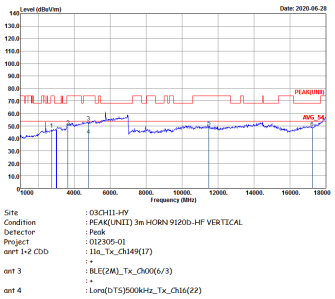
ANT	Mode 2: Ant 1+2 11a Ch149 + Ant 3 BLE(2M) Ch00 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Vertical	Fundamental
Peak		

BLE (Band Edge @ 3m)

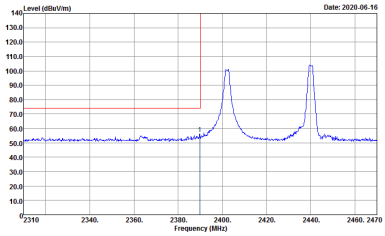
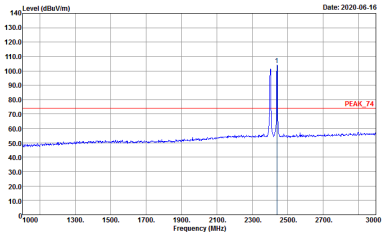
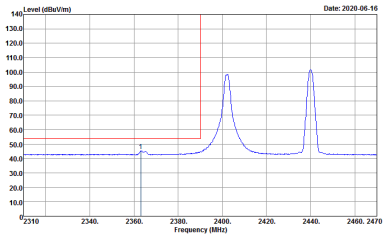
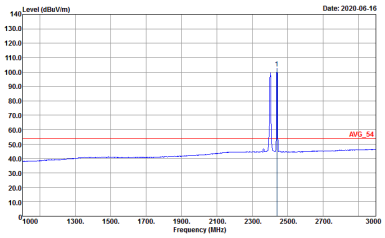
ANT	Mode 2: Ant 1+2 11a Ch149 + Ant 3 BLE(2M) Ch00 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Fundamental
Peak		
Avg.		

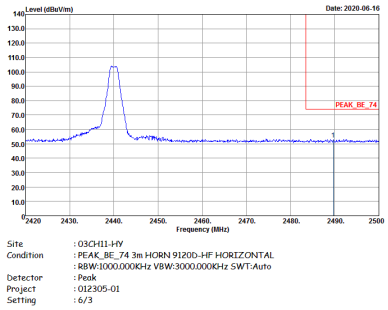
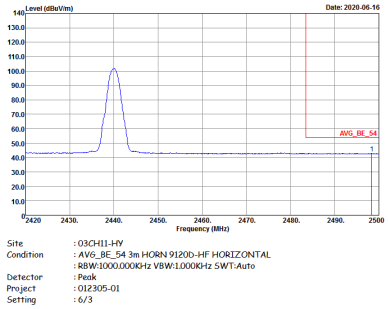
ANT	Mode 2: Ant 1+2 11a Ch149 + Ant 3 BLE(2M) Ch00 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3

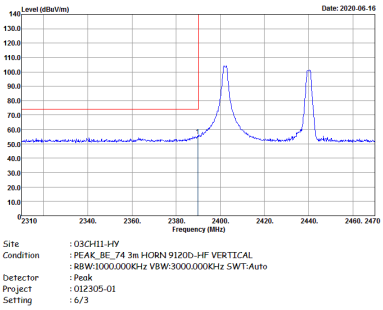
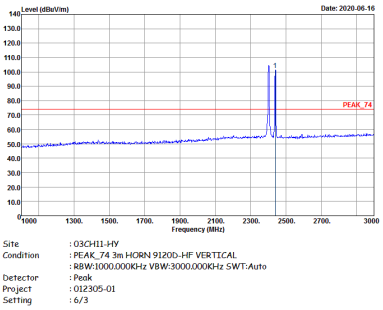
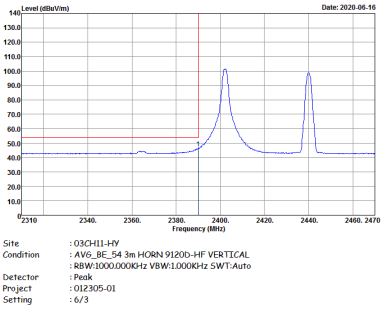
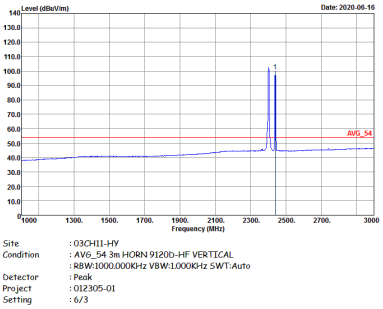
2.4GHz 2400~2483.5MHz, Band 4 5725~5850MHz (Harmonic @ 3m)

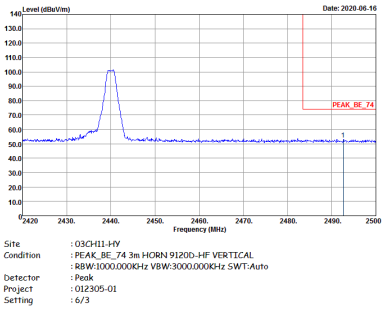
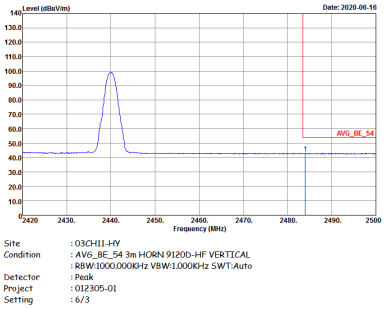
ANT	Mode 2: Ant 1+2 11a Ch149 + Ant 3 BLE(2M) Ch00 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
Peak Avg.		

BLE (Band Edge @ 3m)

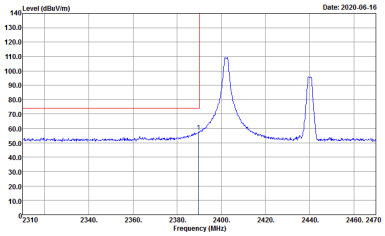
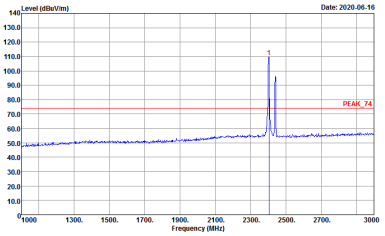
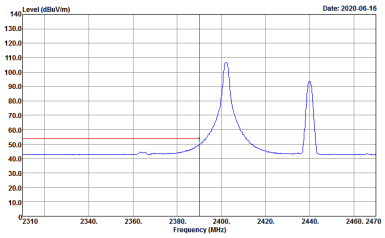
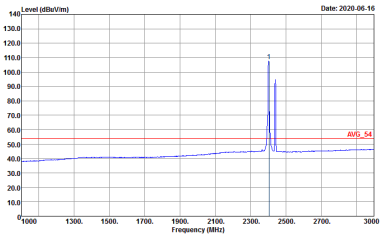
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 012305-01 Setting : 6/3

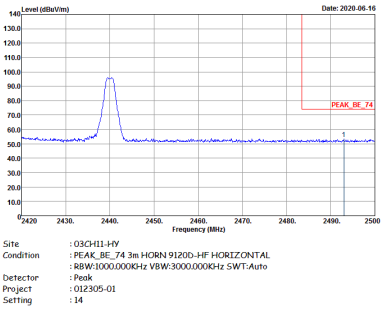
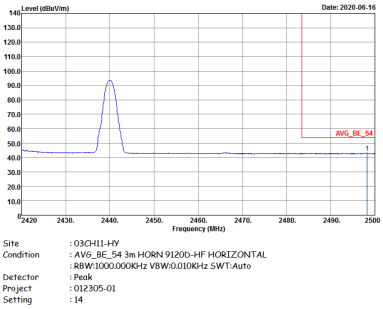
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Horizontal**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

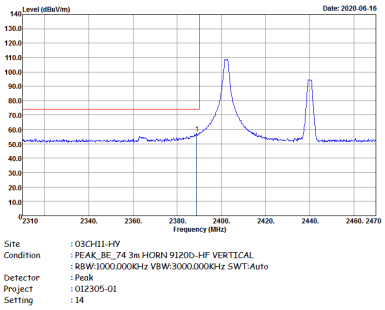
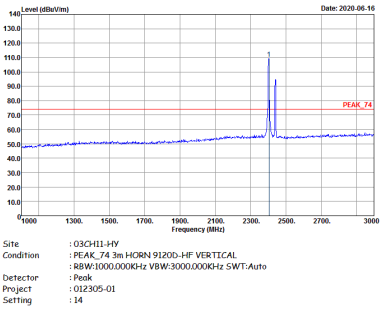
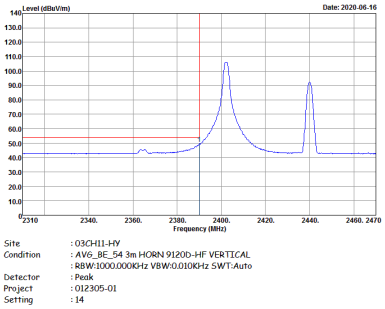
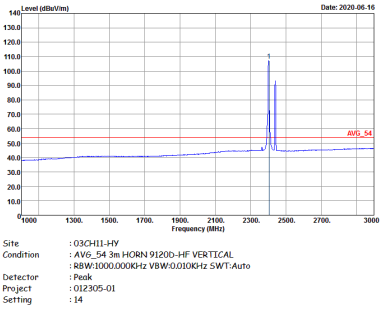
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Vertical	Fundamental
Peak		
Avg.		

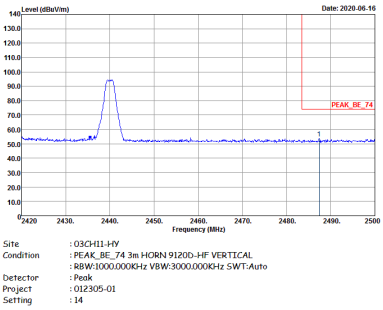
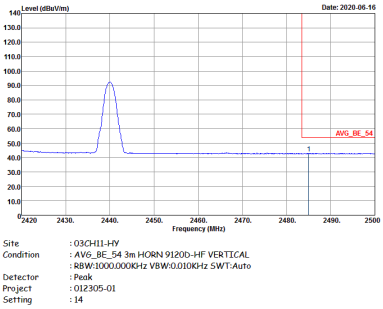
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Vertical**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

Zigbee (Band Edge @ 3m)

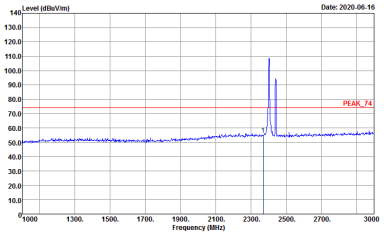
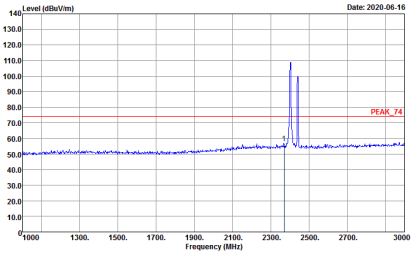
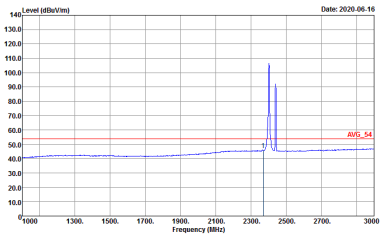
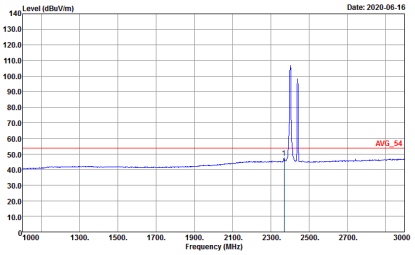
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Horizontal	Fundamental
Peak		
Avg.		

ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Horizontal**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

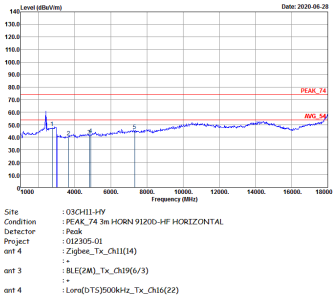
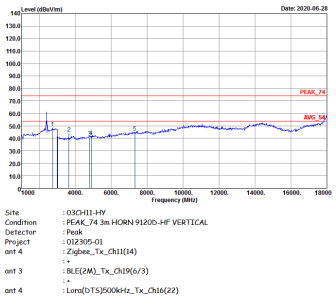
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - L	
Simultaneously	Vertical	Fundamental
Peak		
Avg.		

ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16 - R	
Simultaneously	**Vertical**	**Fundamental**
Peak		Left Blank
Avg.		Left Blank

2.4GHz 2400~2483.5MHz (Harmonic @ 3m)

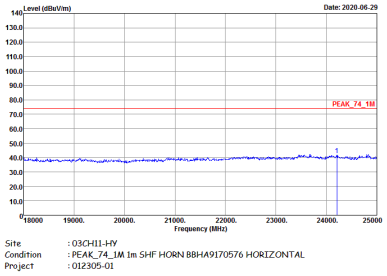
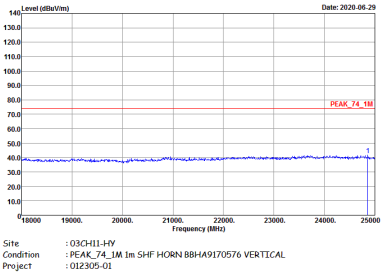
ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
Peak	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 4 : Zigbee_Tx_Ch11(14)(2倍頻) : + ant 3 : BLE(2M)_Tx_Ch19(6/3)(主頻) : + ant 4 : Lora(DTS)500kHz_Tx_Ch16(22)	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 4 : Zigbee_Tx_Ch11(14)(2倍頻) : + ant 3 : BLE(2M)_Tx_Ch19(6/3)(主頻) : + ant 4 : Lora(DTS)500kHz_Tx_Ch16(22)
Avg.	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 4 : Zigbee_Tx_Ch11(14)(2倍頻) : + ant 3 : BLE(2M)_Tx_Ch19(6/3)(主頻) : + ant 4 : Lora(DTS)500kHz_Tx_Ch16(22)	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 012305-01 ant 4 : Zigbee_Tx_Ch11(14)(2倍頻) : + ant 3 : BLE(2M)_Tx_Ch19(6/3)(主頻) : + ant 4 : Lora(DTS)500kHz_Tx_Ch16(22)

2.4GHz 2400~2483.5MHz (Harmonic @ 3m)

ANT	Mode 3: Ant 4 Zigbee Ch11 + Ant 3 BLE(2M) Ch19 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
Peak Avg.		

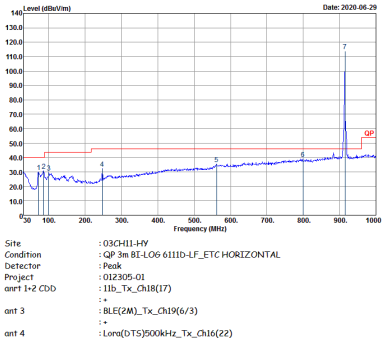
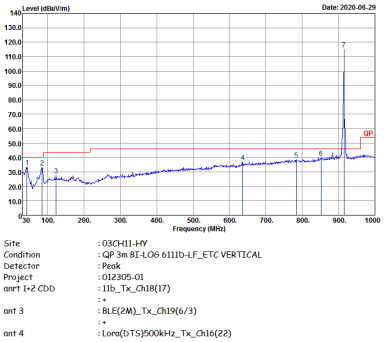
Emission above 18GHz

2.4GHz 2400~2483.5MHz (SHF)

ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
QP / Peak		

Emission below 1GHz

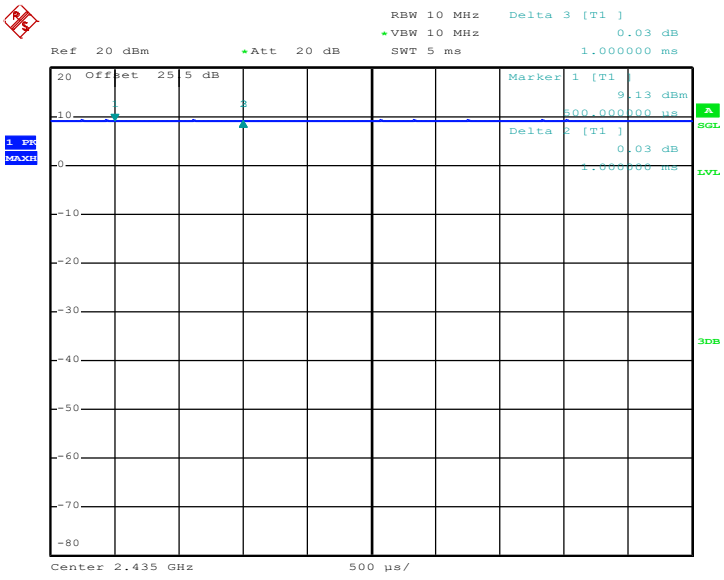
2.4GHz 2400~2483.5MHz (LF)

ANT	Mode 1: Ant 1+2 11b Ch08 + Ant 3 BLE(2M) Ch01 + Ant 4 LoRa (DTS) 500kHz Ch16	
Simultaneously	Horizontal	Vertical
QP / Peak		

Appendix C. Duty Cycle Plots

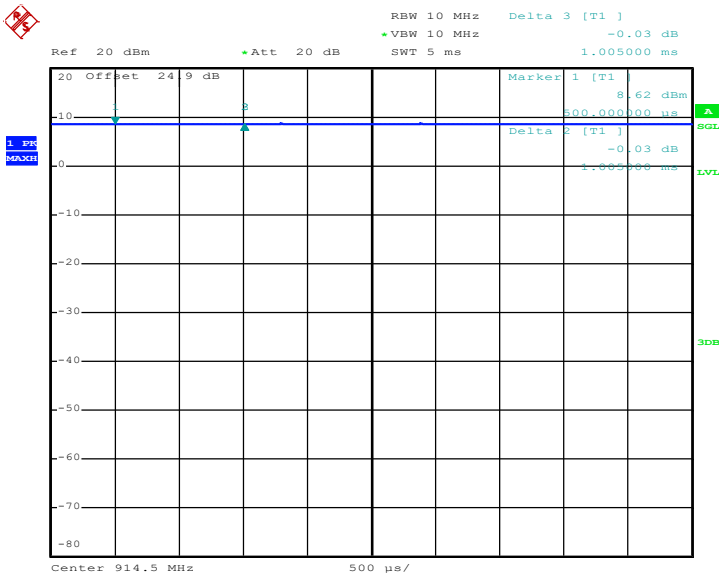
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
-	Zigbee for Ant. 4	100.00	-	-	10Hz	0.00
-	LoRa (DTS) for Ant. 4	100.00	-	-	10Hz	0.00
-	Bluetooth –LE for 2Mbps for Ant. 3	56.91	1070	0.93	1kHz	2.45
1+2	2.4GHz 802.11b for Ant. 1	100.00	-	-	10Hz	0.00
1+2	2.4GHz 802.11b for Ant. 2	100.00	-	-	10Hz	0.00
1+2	5GHz 802.11a for Ant. 1	100.00	-	-	10Hz	0.00
1+2	5GHz 802.11a for Ant. 2	100.00	-	-	10Hz	0.00

Zigbee



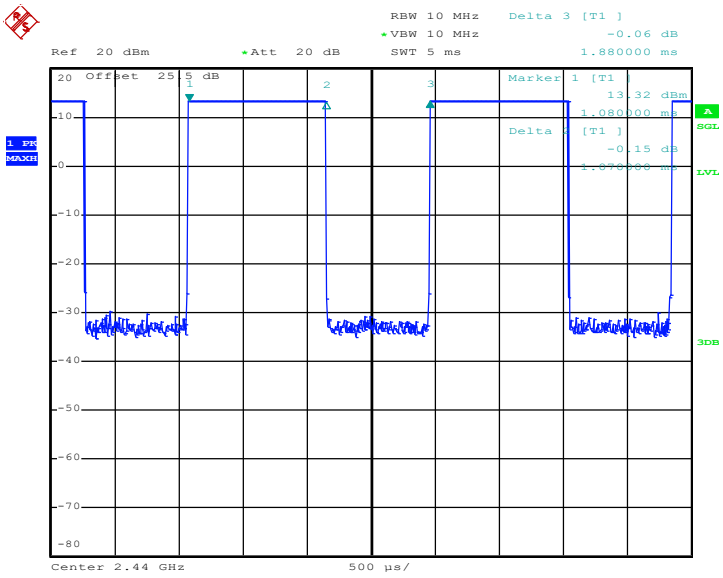
Date: 19.MAY.2020 14:13:54

LoRa (DTS)



Date: 20.MAY.2020 14:31:05

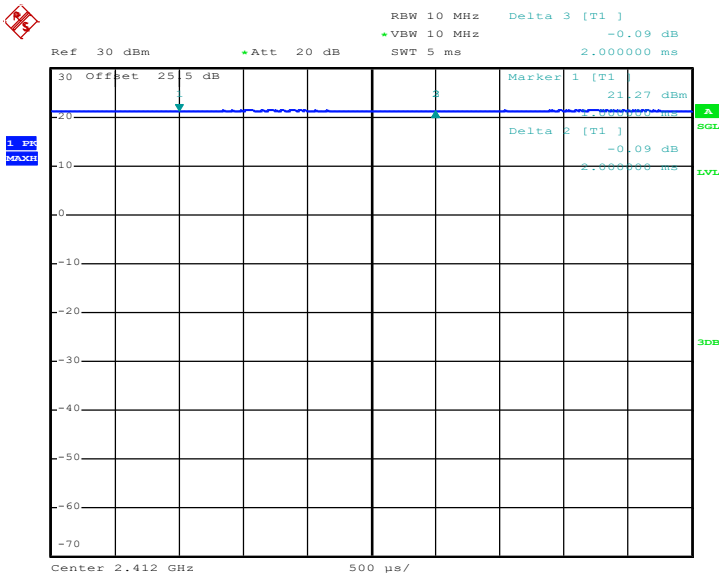
Bluetooth – LE (2Mbps)



Date: 19.MAY.2020 12:05:28

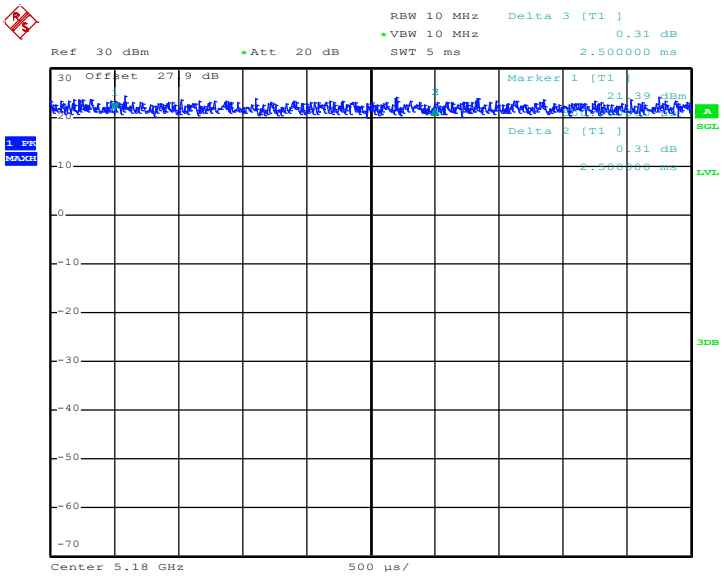
MIMO <Ant. 1>

802.11b



Date: 16.MAY.2020 21:28:53

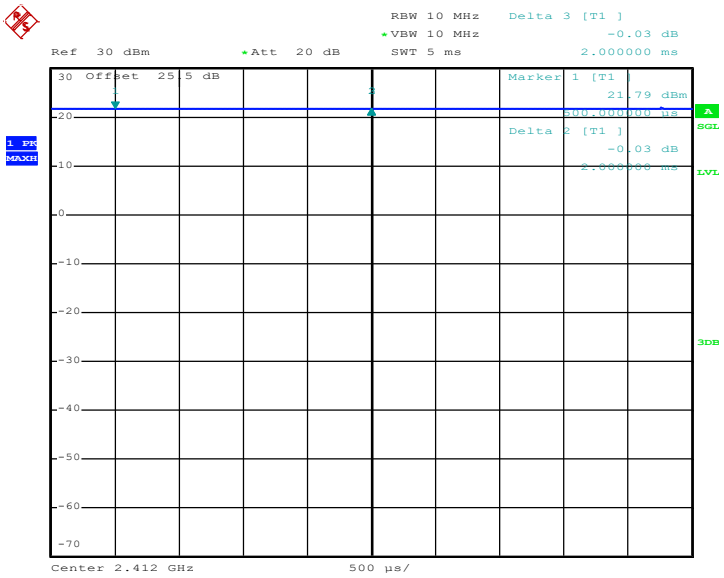
802.11a



Date: 16.MAY.2020 22:17:25

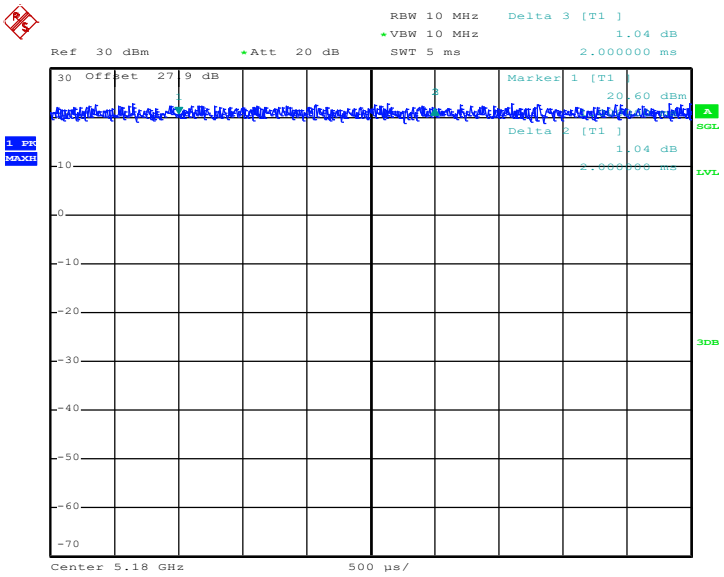
MIMO <Ant. 2>

802.11b



Date: 16.MAY.2020 21:29:48

802.11a



Date: 16.MAY.2020 22:18:10

THE END