FCC Test Report

FCC ID	:	**2AF4TWSMS116**
Equipment	:	**RFID IOT Node Adapter**
Model No.	:	**WSMS-116_AS**
Brand Name	:	**Synin**
Applicant	:	**Synin Corporation**
Address	:	**2F., No.14, Ln.123, Sec.6, Minquan E. Rd., Neihu Dist.,Taipei City 11490, Taiwan (R.O.C)**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Oct. 16, 2015**
Tested Date	:	**Nov. 25 ~ Dec. 02, 2015**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:

Gary Chang / Manager

Testing Laboratory
2732

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Release Record

Report No.	Version	Description	Issued Date
FR561003-01-1	Rev. 01	Initial issue	Dec. 15, 2015

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 20.464MHz 28.05 (Margin -21.95dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 47.46MHz 36.96 (Margin -3.04dB) - PK	Pass
15.247(d)	Band Edge	Meet the requirement of limit	Pass
15.247(b)(2)(3)	Conducted Output Power	Power [dBm]: 19.61	Pass
15.247(a)(1)(i)	Number of Hopping Channels	Meet the requirement of limit	Pass
15.247(a)(1)	Hopping Channel Separation	Meet the requirement of limit	Pass
15.247(f)	Dwell Time	Meet the requirement of limit	Pass
15.247(f)	Power spectral density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information						
Frequency Range (MHz)	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**Data Rate(bit/sec)**	**Spread Factor**	**Channel spacing (kHz)**
902 ~ 928	902.3 ~ 924.375	1-90 [80]	1	977 ~ 5469	10 ~ 7	200 / 250
Note 1: RF output power specifies thatMaximum Conducted (Average) Output Power. Note 2: The device uses CSS modulation.						

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Gain (dBi)	Connector	Remark
1	TSKY Co., Ltd.	A8-A003-00106	Dipole	0	SMA	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from AC adapter 24Vdc from DC power supply

1.1.4 Support Unit

Support Unit		
No.	**Equipment**	**Description**
1	AC adapter	Brand: OEM Model: ADS0128-W 120100 Power Rating: I/P: 100-240Vac, 50-60Hz, 0.5A O/P: 12.0Vdc, 1.0A DC 1.5m non-shielded cable without core

Note: Support unit listed above was supplied by applicant.

1.1.5 Channel List

Channel spacing									
200 kHz								250 kHz	
Group 1		Group 2		Group 3		Group 4		Group 5	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.3	19	905.5	37	908.7	55	911.9	73	920.625
2	902.5	20	905.7	38	908.9	56	912.1	74	920.875
3	902.7	21	905.9	39	909.1	57	912.3	75	921.125
4	902.9	22	906.1	40	909.3	58	912.5	76	921.375
6	903.1	24	906.3	42	909.5	60	912.7	77	921.625
7	903.3	25	906.5	43	909.7	61	912.9	78	921.875
8	903.5	26	906.7	44	909.9	62	913.1	80	922.125
9	903.7	27	906.9	45	910.1	63	913.3	81	922.375
10	903.9	28	907.1	46	910.3	64	913.5	82	922.625
11	904.1	29	907.3	47	910.5	65	913.7	83	922.875
12	904.3	30	907.5	48	910.7	66	913.9	84	923.125
13	904.5	31	907.7	49	910.9	67	914.1	85	923.375
15	904.7	33	907.9	51	911.1	69	914.3	87	923.625
16	904.9	34	908.1	52	911.3	70	914.5	88	923.875
17	905.1	35	908.3	53	911.5	71	914.7	89	924.125
18	905.3	36	908.5	54	911.7	72	914.9	90	924.375

1.1.6 Test Tool and Duty Cycle

Test Tool	Putty, Ver. 0.60.0.0

1.1.7 Power Setting

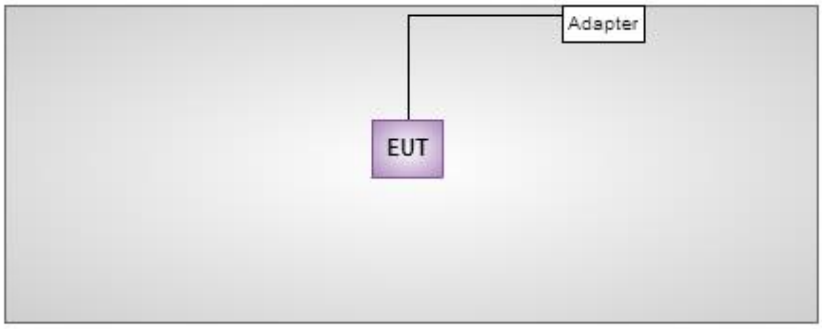
Modulation Mode	Test Frequency (MHz)		
	902.3	910.1	924.375
CSS	20	20	20

1.2 Local Support Equipment List

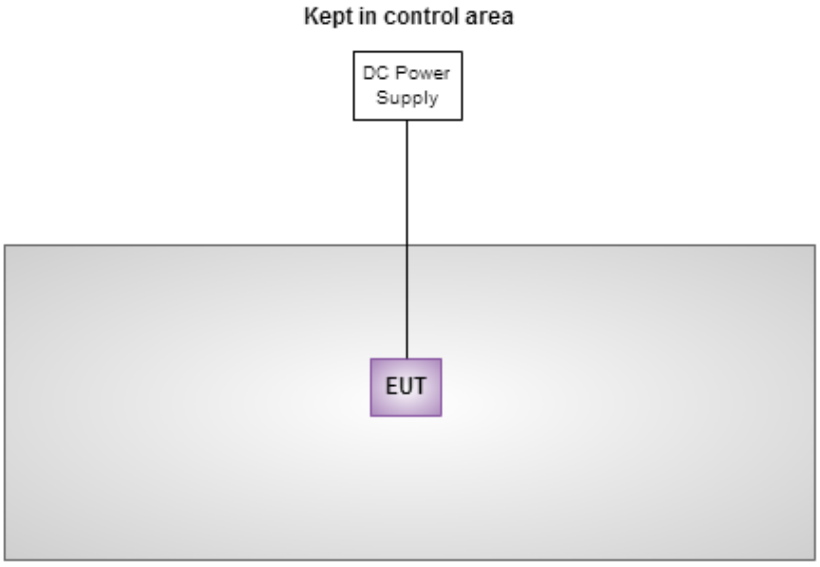
Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	---	---	---	---	---

1.3 Test Setup Chart

Test Setup Diagram (AC adapter mode)



Test Setup Diagram (DC power supply mode)



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
EMC Receiver	R&S	ESCS 30	100169	Oct. 21, 2015	Oct. 20, 2016
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015
DC POWER SOURCE	GW INSTEK	GPC-3060D	EM884797	Oct. 20, 2015	Oct. 19, 2016
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101498	Dec. 09, 2014	Dec. 08, 2015
Receiver	R&S	ESR3	101658	Nov. 04, 2015	Nov. 03, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 20, 2015	Aug. 19, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2014	Dec. 10, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 04, 2015	Nov. 03, 2016
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 16, 2015	Nov. 15, 2016
Preamplifier	Burgeon	BPA-530	SN:100219	Sep. 10, 2015	Sep. 09, 2016
Preamplifier	Agilent	83017A	MY39501308	Oct. 02, 2015	Oct. 01, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 15, 2014	Dec. 14, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 15, 2014	Dec. 14, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 15, 2014	Dec. 14, 2015
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 15, 2014	Dec. 14, 2015
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 15, 2014	Dec. 14, 2015
DC POWER SOURCE	GW INSTEK	GPC-3060D	EM884797	Oct. 20, 2015	Oct. 19, 2016
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 2016
Signal Generator	R&S	SMB100A	175727	Oct. 05, 2015	Oct. 04, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247
FCC Public notice DA 00-705
ANSI C63.10-2013

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.72 dB
Radiated emission > 1GHz	±5.65 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 59%	Peter Lin
Radiated Emissions	03CH01-WS	21-23°C / 61-65%	Aska Huang Warren Lee Anderson Hung
RF Conducted	TH01-WS	22°C / 64%	Alex Huang

- FCC site registration No.: 657002
- IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Test Frequency (MHz)	Modulation / SF	Test Configuration
Conducted Emissions	902.3 / 910.1 / 924.375	CSS / 10	1, 2
Radiated Emissions ≤ 1GHz	902.3 / 910.1 / 924.375	CSS / 10	1, 2
Radiated Emissions > 1GHz Conducted Output Power	902.3 / 910.1 / 924.375	CSS / 10	1
Number of Hopping Channels	902.3 ~ 924.375	CSS / 10	1
Hopping Channel Separation	902.3 / 910.1 / 914.9 920.625 / 924.375	CSS / 10	1
Dwell Time	902.7 / 906.9 / 910.1 / 913.3 / 922.375	CSS: 10 / 9 / 8 / 7	1
Power spectral density	902.3 / 910.1 / 924.375	CSS / 10	1

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** results were found as the worst case and were shown in this report.
2. The EUT had been tested by following test configurations.
   1) Configuration 1 : AC Adapter mode
   2) Configuration 2 : DC Power Supply mode

3 Transmitter Test Results

3.1 Conducted Emissions

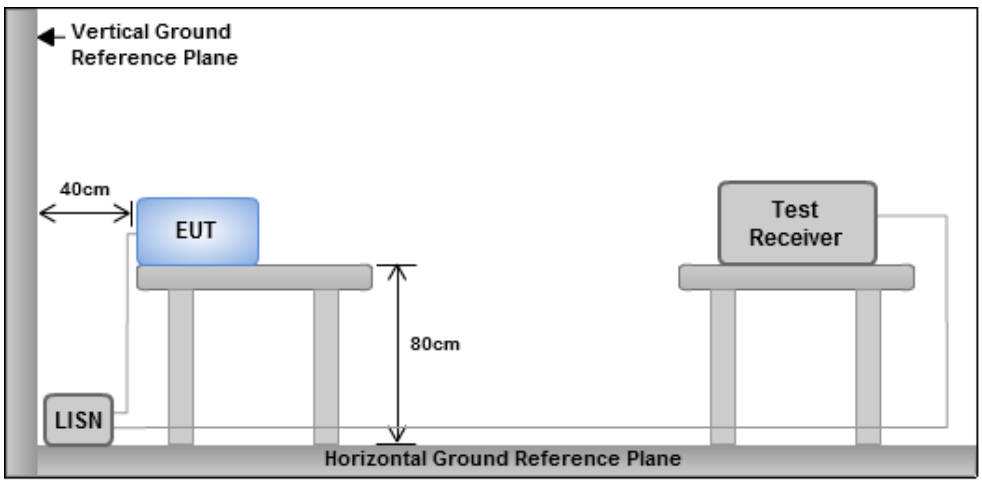
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V/60Hz

3.1.3 Test Setup

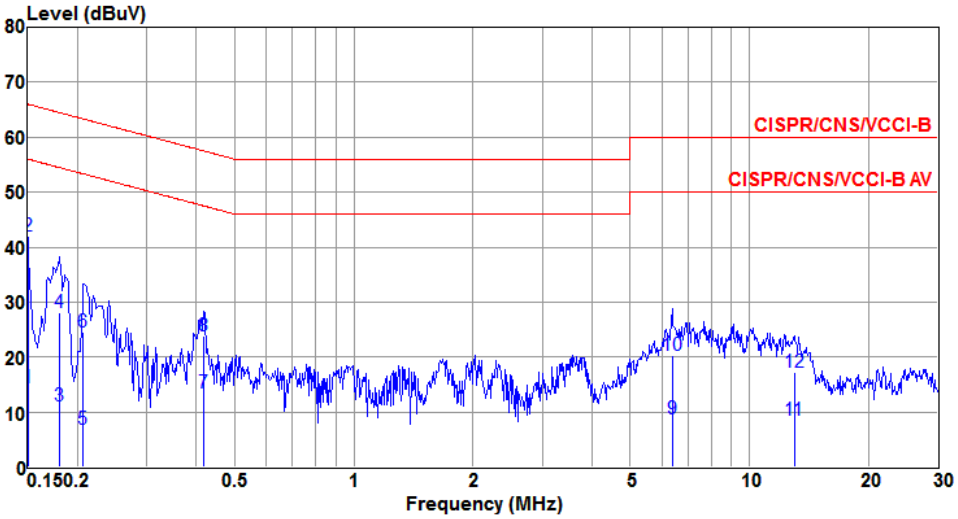


Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

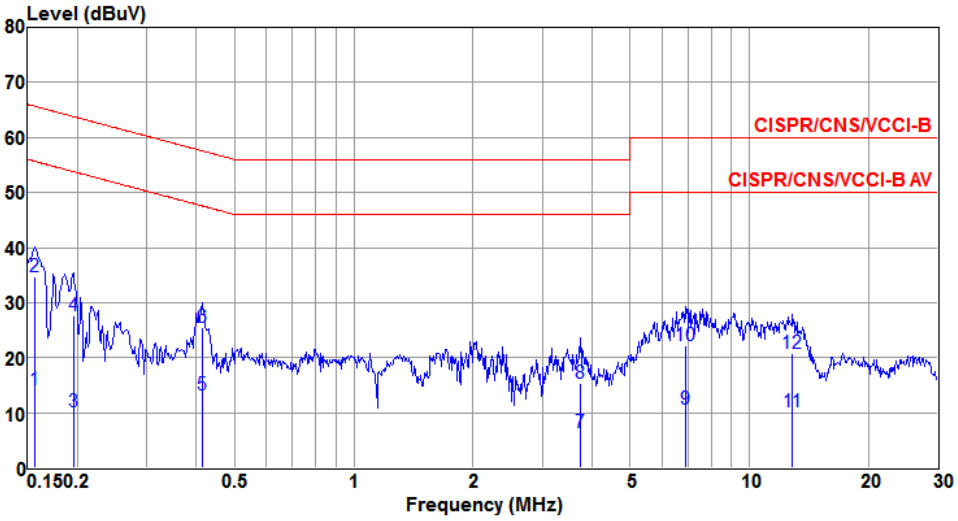
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Power Phase	Line	Test Configuration	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.150	14.42	56.00	-41.58	13.42	0.92	0.08	Average
2@	0.150	42.13	66.00	-23.87	41.13	0.92	0.08	QP
3	0.181	11.11	54.46	-43.35	10.54	0.48	0.09	Average
4	0.181	28.05	64.46	-36.41	27.48	0.48	0.09	QP
5	0.207	6.97	53.32	-46.35	6.63	0.25	0.09	Average
6	0.207	24.64	63.32	-38.68	24.30	0.25	0.09	QP
7	0.417	13.35	47.51	-34.16	13.06	0.18	0.11	Average
8	0.417	23.95	57.51	-33.56	23.66	0.18	0.11	QP
9	6.386	8.71	50.00	-41.29	7.94	0.47	0.30	Average
10	6.386	20.29	60.00	-39.71	19.52	0.47	0.30	QP
11	12.988	8.53	50.00	-41.47	7.58	0.71	0.24	Average
12	12.988	17.31	60.00	-42.69	16.36	0.71	0.24	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

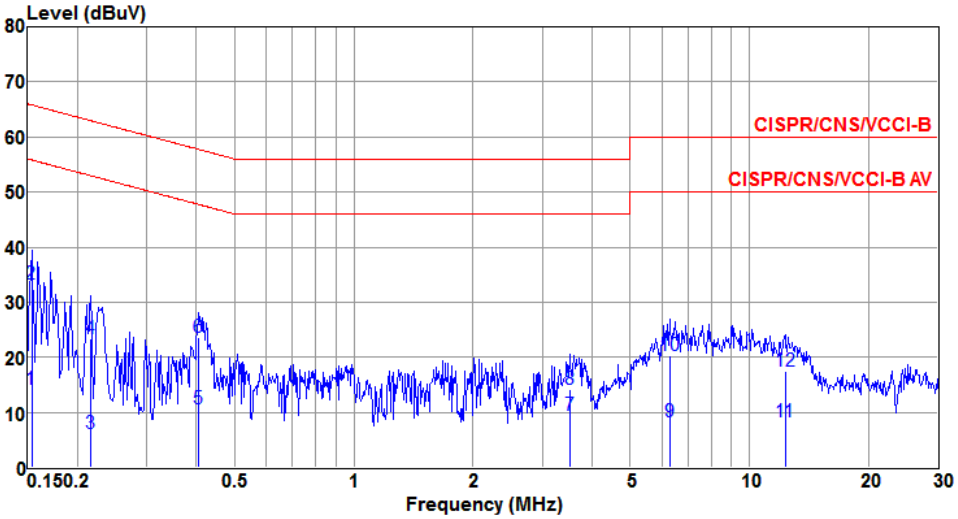
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Power Phase	Neutral	Test Configuration	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	14.20	55.65	-41.45	13.36	0.76	0.08	Average
2@	0.156	34.71	65.65	-30.94	33.87	0.76	0.08	QP
3	0.195	10.05	53.80	-43.75	9.67	0.29	0.09	Average
4	0.195	27.61	63.80	-36.19	27.23	0.29	0.09	QP
5	0.413	13.33	47.59	-34.26	13.09	0.13	0.11	Average
6	0.413	25.52	57.59	-32.07	25.28	0.13	0.11	QP
7	3.740	6.32	46.00	-39.68	5.33	0.69	0.30	Average
8	3.740	15.37	56.00	-40.63	14.38	0.69	0.30	QP
9	6.878	10.60	50.00	-39.40	9.69	0.61	0.30	Average
10	6.878	22.18	60.00	-37.82	21.27	0.61	0.30	QP
11	12.852	10.23	50.00	-39.77	9.39	0.60	0.24	Average
12	12.852	20.74	60.00	-39.26	19.90	0.60	0.24	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

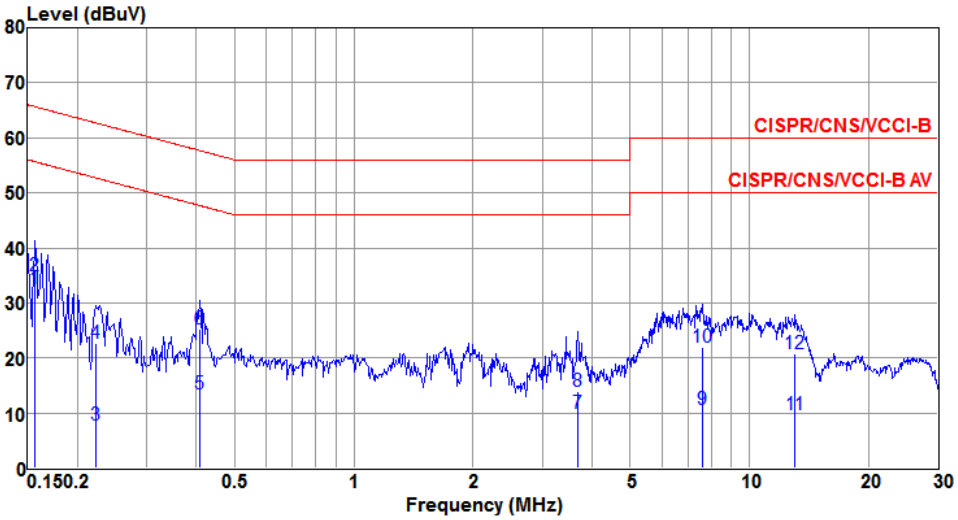
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Power Phase	Line	Test Configuration	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.153	14.23	55.82	-41.59	14.15	0.00	0.08	Average
2@	0.153	33.39	65.82	-32.43	33.31	0.00	0.08	QP
3	0.216	6.15	52.96	-46.81	6.06	0.00	0.09	Average
4	0.216	23.27	62.96	-39.69	23.18	0.00	0.09	QP
5	0.406	10.72	47.73	-37.01	10.61	0.00	0.11	Average
6	0.406	23.67	57.73	-34.06	23.56	0.00	0.11	QP
7	3.509	9.47	46.00	-36.53	9.17	0.00	0.30	Average
8	3.509	14.16	56.00	-41.84	13.86	0.00	0.30	QP
9	6.285	8.28	50.00	-41.72	7.97	0.00	0.31	Average
10	6.285	20.24	60.00	-39.76	19.93	0.00	0.31	QP
11	12.318	8.18	50.00	-41.82	7.93	0.00	0.25	Average
12	12.318	17.57	60.00	-42.43	17.32	0.00	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

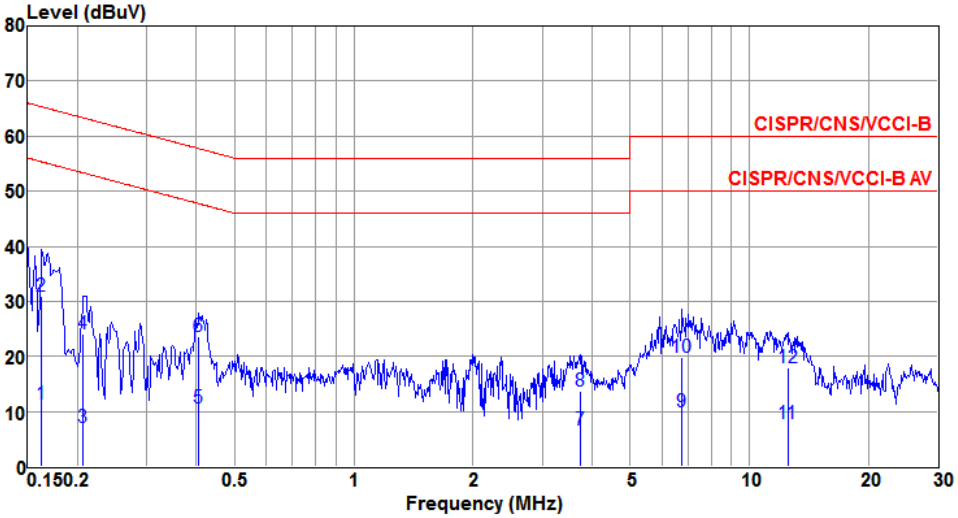
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Power Phase	Neutral	Test Configuration	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	32.55	65.65	-33.10	32.47	0.00	0.08	QP
2@	0.156	34.93	65.65	-30.72	34.85	0.00	0.08	QP
3	0.222	7.84	52.74	-44.90	7.75	0.00	0.09	Average
4	0.222	22.77	62.74	-39.97	22.68	0.00	0.09	QP
5	0.408	13.52	47.68	-34.16	13.41	0.00	0.11	Average
6	0.408	25.35	57.68	-32.33	25.24	0.00	0.11	QP
7	3.681	9.87	46.00	-36.13	9.57	0.00	0.30	Average
8	3.681	13.90	56.00	-42.10	13.60	0.00	0.30	QP
9	7.606	10.70	50.00	-39.30	10.40	0.00	0.30	Average
10	7.606	22.04	60.00	-37.96	21.74	0.00	0.30	QP
11	13.057	9.62	50.00	-40.38	9.38	0.00	0.24	Average
12	13.057	20.72	60.00	-39.28	20.48	0.00	0.24	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

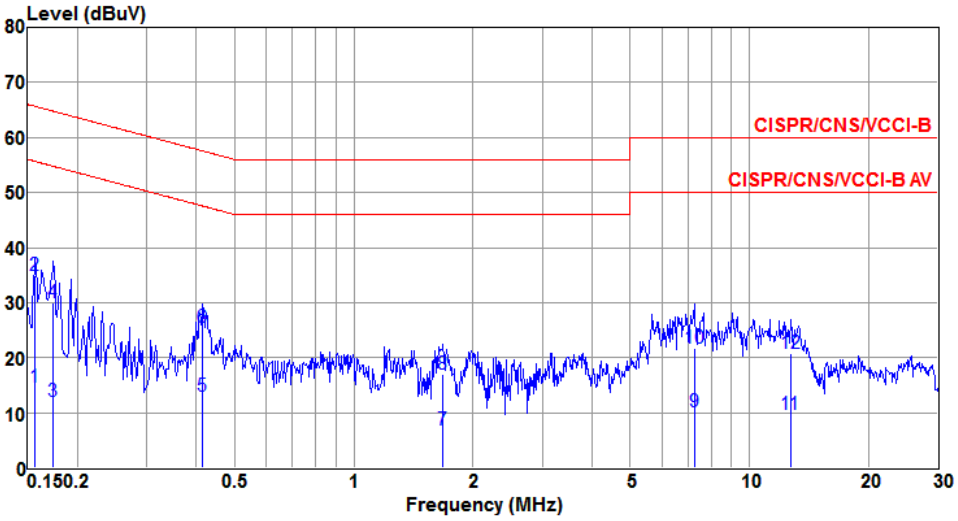
Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Power Phase	Line	Test Configuration	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.162	11.37	55.34	-43.97	11.29	0.00	0.08	Average
2	0.162	30.99	65.34	-34.35	30.91	0.00	0.08	QP
3	0.207	7.01	53.32	-46.31	6.92	0.00	0.09	Average
4	0.207	24.07	63.32	-39.25	23.98	0.00	0.09	QP
5	0.406	10.72	47.73	-37.01	10.61	0.00	0.11	Average
6@	0.406	23.69	57.73	-34.04	23.58	0.00	0.11	QP
7	3.740	6.65	46.00	-39.35	6.35	0.00	0.30	Average
8	3.740	13.67	56.00	-42.33	13.37	0.00	0.30	QP
9	6.769	10.00	50.00	-40.00	9.70	0.00	0.30	Average
10	6.769	19.87	60.00	-40.13	19.57	0.00	0.30	QP
11	12.516	7.91	50.00	-42.09	7.66	0.00	0.25	Average
12	12.516	17.84	60.00	-42.16	17.59	0.00	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

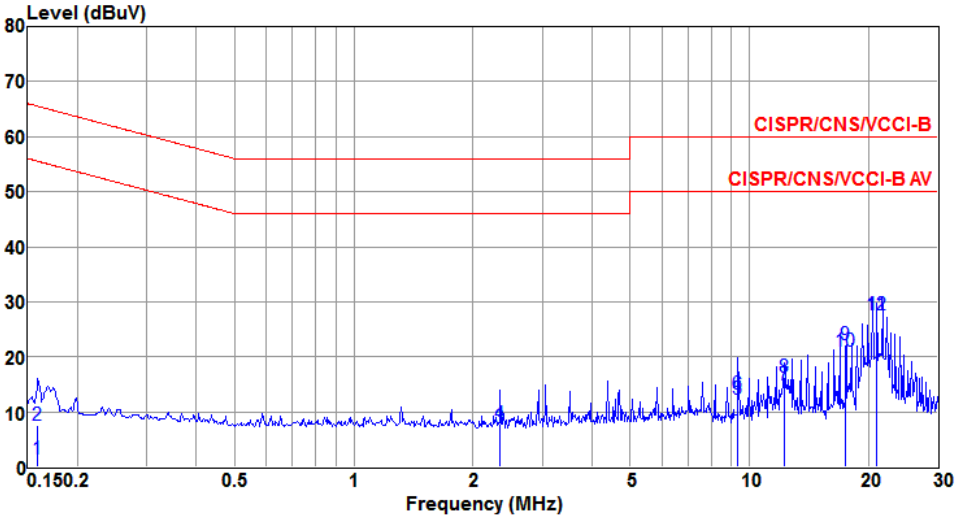
Modulation / SF	CSS / 10	**Test Freq. (MHz)**	924.375
Power Phase	Neutral	**Test Configuration**	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	14.62	55.65	-41.03	14.54	0.00	0.08	Average
2@	0.156	35.01	65.65	-30.64	34.93	0.00	0.08	QP
3	0.174	12.07	54.77	-42.70	11.98	0.00	0.09	Average
4	0.174	29.96	64.77	-34.81	29.87	0.00	0.09	QP
5	0.415	13.09	47.55	-34.46	12.98	0.00	0.11	Average
6	0.415	25.39	57.55	-32.16	25.28	0.00	0.11	QP
7	1.680	6.80	46.00	-39.20	6.58	0.00	0.22	Average
8	1.680	17.10	56.00	-38.90	16.88	0.00	0.22	QP
9	7.252	10.27	50.00	-39.73	9.97	0.00	0.30	Average
10	7.252	21.68	60.00	-38.32	21.38	0.00	0.30	QP
11	12.716	9.68	50.00	-40.32	9.44	0.00	0.24	Average
12	12.716	20.71	60.00	-39.29	20.47	0.00	0.24	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

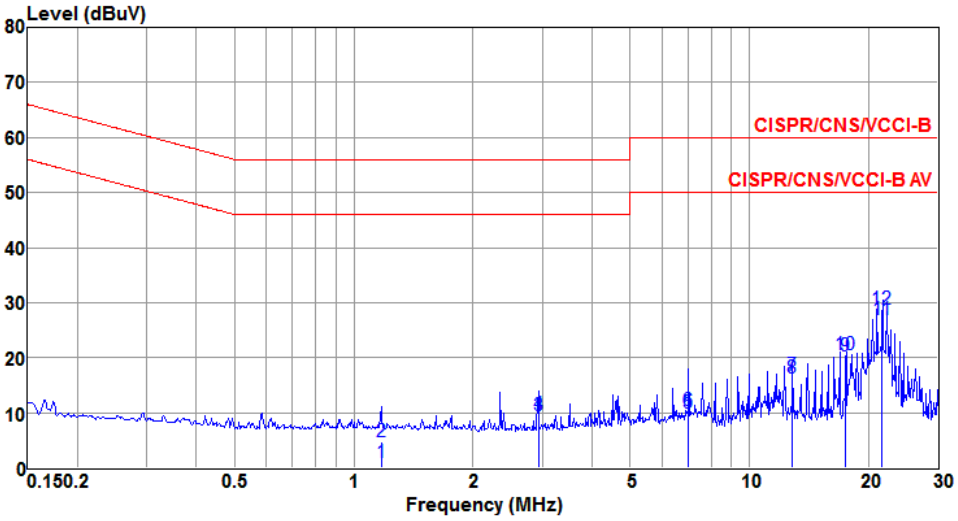
Modulation / SF	CSS / 10	**Test Freq. (MHz)**	902.3
Power Phase	Line	**Test Configuration**	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.159	1.43	55.52	-54.09	1.24	0.11	0.08	Average
2	0.159	7.50	65.52	-58.02	7.31	0.11	0.08	QP
3	2.334	7.02	46.00	-38.98	6.59	0.17	0.26	Average
4	2.334	7.78	56.00	-48.22	7.35	0.17	0.26	QP
5	9.353	12.33	50.00	-37.67	11.79	0.24	0.30	Average
6	9.353	13.30	60.00	-46.70	12.76	0.24	0.30	QP
7	12.280	14.79	50.00	-35.21	14.26	0.28	0.25	Average
8	12.280	16.28	60.00	-43.72	15.75	0.28	0.25	QP
9	17.539	22.16	50.00	-27.84	21.71	0.35	0.10	Average
10	17.539	21.02	60.00	-38.98	20.57	0.35	0.10	QP
11@	21.049	27.52	50.00	-22.48	27.10	0.38	0.04	Average
12	21.049	27.52	60.00	-32.48	27.10	0.38	0.04	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

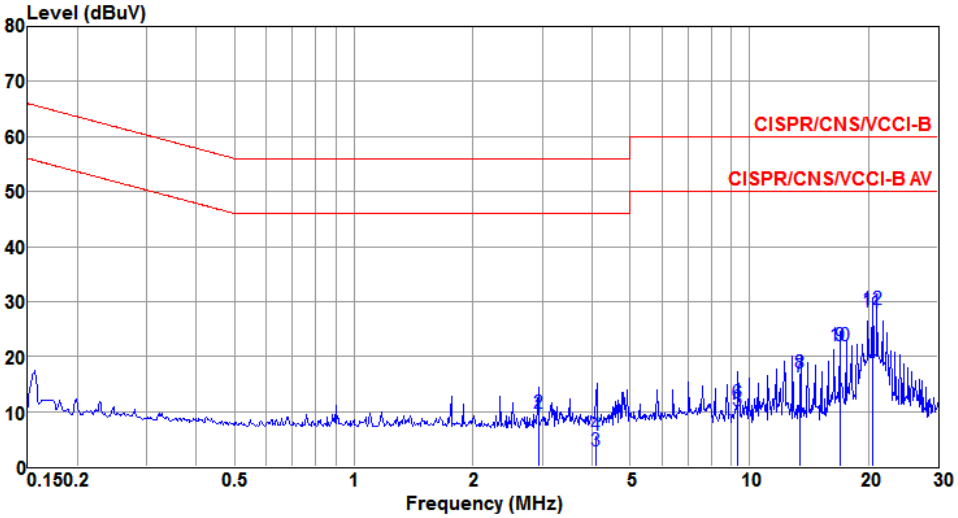
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Power Phase	Neutral	Test Configuration	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	1.172	1.03	46.00	-44.97	0.71	0.14	0.18	Average
2	1.172	4.75	56.00	-51.25	4.43	0.14	0.18	QP
3	2.925	9.49	46.00	-36.51	9.04	0.17	0.28	Average
4	2.925	9.72	56.00	-46.28	9.27	0.17	0.28	QP
5	7.014	10.03	50.00	-39.97	9.50	0.23	0.30	Average
6	7.014	10.46	60.00	-49.54	9.93	0.23	0.30	QP
7	12.863	16.83	50.00	-33.17	16.27	0.32	0.24	Average
8	12.863	16.34	60.00	-43.66	15.78	0.32	0.24	QP
9	17.540	20.42	50.00	-29.58	19.94	0.38	0.10	Average
10	17.540	20.46	60.00	-39.54	19.98	0.38	0.10	QP
11@	21.633	26.83	50.00	-23.17	26.36	0.42	0.05	Average
12	21.633	28.81	60.00	-31.19	28.34	0.42	0.05	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

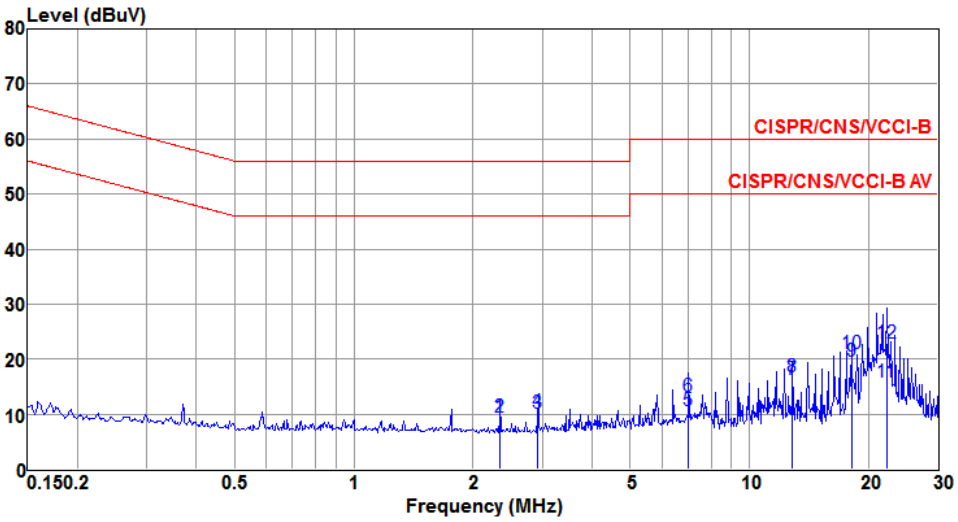
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Power Phase	Line	Test Configuration	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	2.925	9.25	46.00	-36.75	8.79	0.18	0.28	Average
2	2.925	9.67	56.00	-46.33	9.21	0.18	0.28	QP
3	4.090	2.78	46.00	-43.22	2.28	0.19	0.31	Average
4	4.090	5.62	56.00	-50.38	5.12	0.19	0.31	QP
5	9.352	10.06	50.00	-39.94	9.52	0.24	0.30	Average
6	9.352	11.60	60.00	-48.40	11.06	0.24	0.30	QP
7	13.452	16.31	50.00	-33.69	15.78	0.30	0.23	Average
8	13.452	17.09	60.00	-42.91	16.56	0.30	0.23	QP
9	16.957	22.06	50.00	-27.94	21.60	0.34	0.12	Average
10	16.957	21.86	60.00	-38.14	21.40	0.34	0.12	QP
11@	20.464	28.05	50.00	-21.95	27.64	0.38	0.03	Average
12	20.464	28.52	60.00	-31.48	28.11	0.38	0.03	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

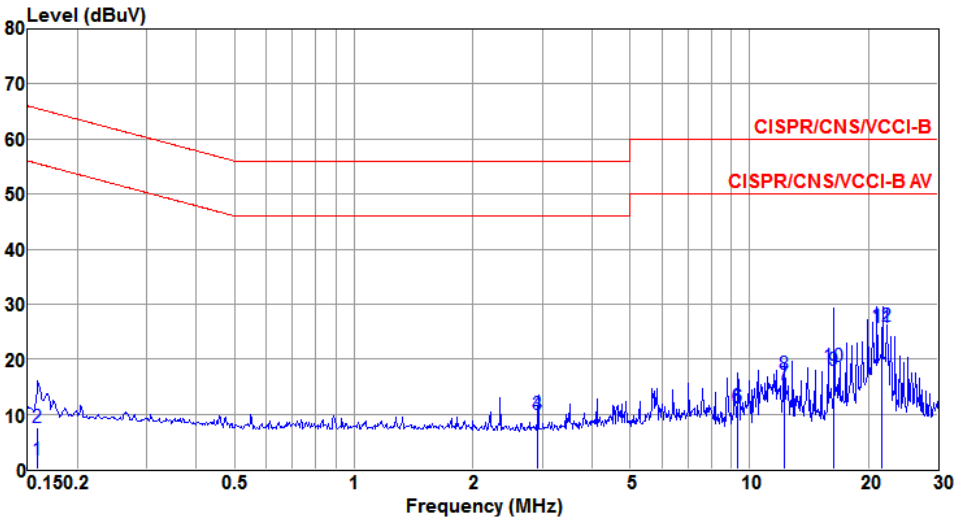
Modulation / SF	CSS / 10	**Test Freq. (MHz)**	910.1
Power Phase	Neutral	**Test Configuration**	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	2.337	9.52	46.00	-36.48	9.09	0.17	0.26	Average
2	2.337	9.49	56.00	-46.51	9.06	0.17	0.26	QP
3	2.923	10.26	46.00	-35.74	9.81	0.17	0.28	Average
4	2.923	10.28	56.00	-45.72	9.83	0.17	0.28	QP
5	7.015	10.69	50.00	-39.31	10.16	0.23	0.30	Average
6	7.015	13.11	60.00	-46.89	12.58	0.23	0.30	QP
7	12.861	16.28	50.00	-33.72	15.72	0.32	0.24	Average
8	12.861	16.79	60.00	-43.21	16.23	0.32	0.24	QP
9@	18.125	19.51	50.00	-30.49	19.05	0.38	0.08	Average
10	18.125	20.92	60.00	-39.08	20.46	0.38	0.08	QP
11	22.210	15.77	50.00	-34.23	15.30	0.42	0.05	Average
12	22.210	22.85	60.00	-37.15	22.38	0.42	0.05	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

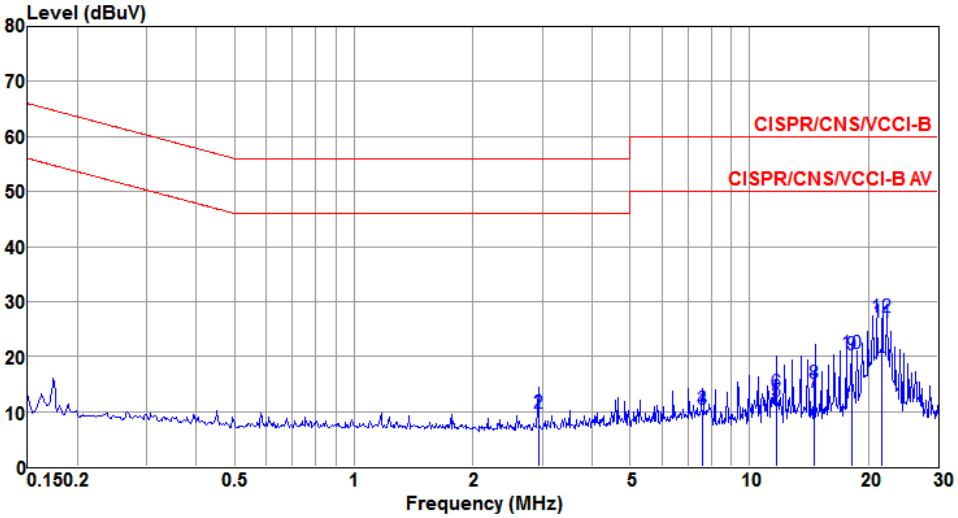
Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Power Phase	Line	Test Configuration	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.159	1.59	55.52	-53.93	1.40	0.11	0.08	Average
2	0.159	7.58	65.52	-57.94	7.39	0.11	0.08	QP
3	2.923	9.95	46.00	-36.05	9.49	0.18	0.28	Average
4	2.923	9.95	56.00	-46.05	9.49	0.18	0.28	QP
5	9.352	11.15	50.00	-38.85	10.61	0.24	0.30	Average
6	9.352	11.42	60.00	-48.58	10.88	0.24	0.30	QP
7	12.279	15.40	50.00	-34.60	14.87	0.28	0.25	Average
8	12.279	17.17	60.00	-42.83	16.64	0.28	0.25	QP
9	16.370	18.00	50.00	-32.00	17.52	0.33	0.15	Average
10	16.370	18.76	60.00	-41.24	18.28	0.33	0.15	QP
11@	21.629	25.83	50.00	-24.17	25.39	0.39	0.05	Average
12	21.629	25.90	60.00	-34.10	25.46	0.39	0.05	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation / SF	CSS / 10	**Test Freq. (MHz)**	924.375
Power Phase	Neutral	**Test Configuration**	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	2.925	9.85	46.00	-36.15	9.40	0.17	0.28	Average
2	2.925	9.78	56.00	-46.22	9.33	0.17	0.28	QP
3	7.600	10.40	50.00	-39.60	9.86	0.24	0.30	Average
4	7.600	10.40	60.00	-49.60	9.86	0.24	0.30	QP
5	11.692	11.70	50.00	-38.30	11.14	0.30	0.26	Average
6	11.692	13.48	60.00	-46.52	12.92	0.30	0.26	QP
7	14.616	13.44	50.00	-36.56	12.89	0.34	0.21	Average
8	14.616	15.03	60.00	-44.97	14.48	0.34	0.21	QP
9	18.126	20.32	50.00	-29.68	19.86	0.38	0.08	Average
10	18.126	20.58	60.00	-39.42	20.12	0.38	0.08	QP
11@	21.634	26.24	50.00	-23.76	25.77	0.42	0.05	Average
12	21.634	27.16	60.00	-32.84	26.69	0.42	0.05	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

3.2 Unwanted Emissions into Restricted Frequency Bands

3.2.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.2.2 Test Procedures

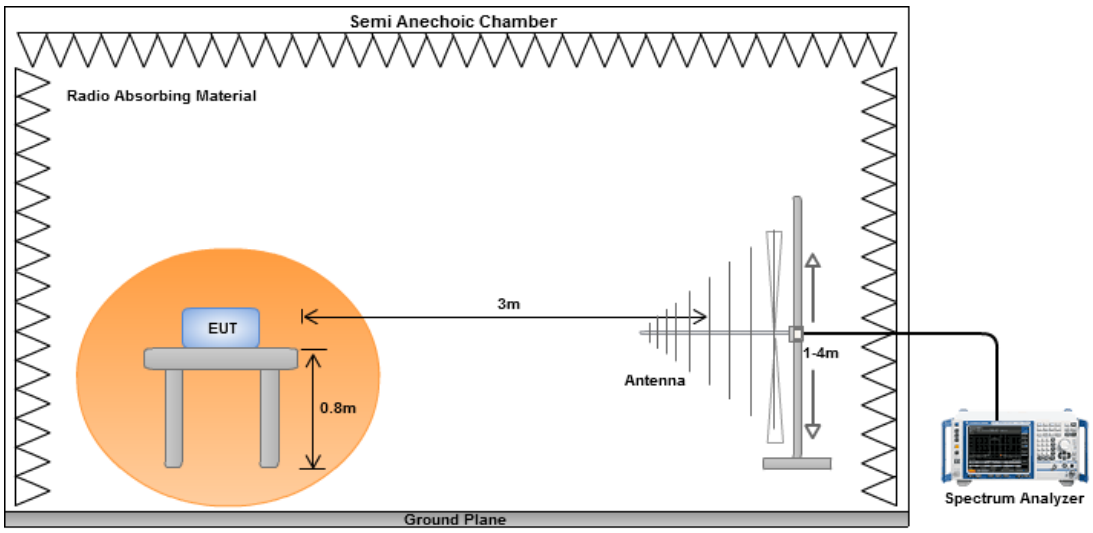
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

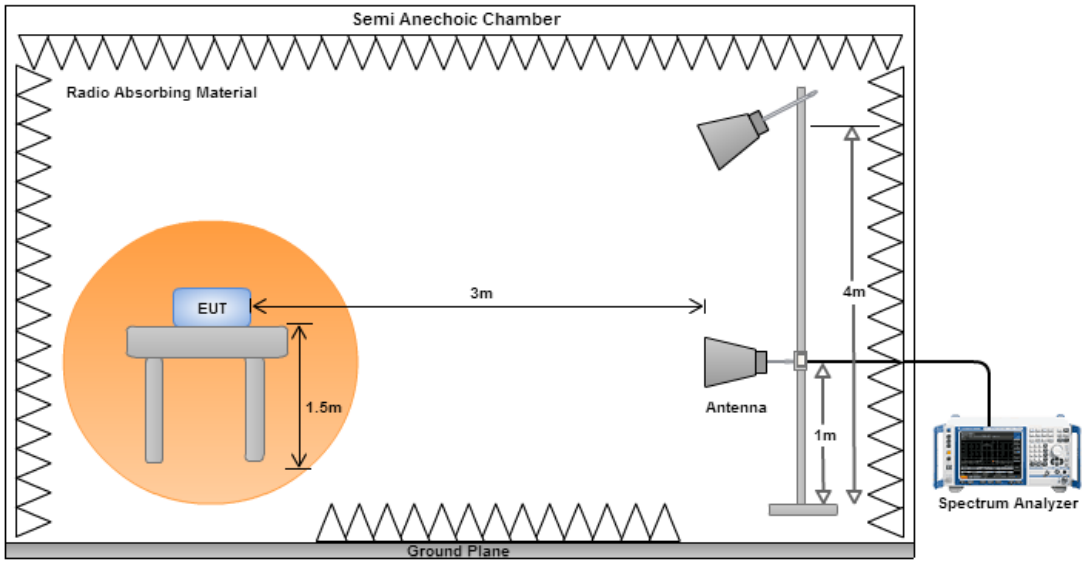
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.2.3 Test Setup

Radiated Emissions below 1 GHz

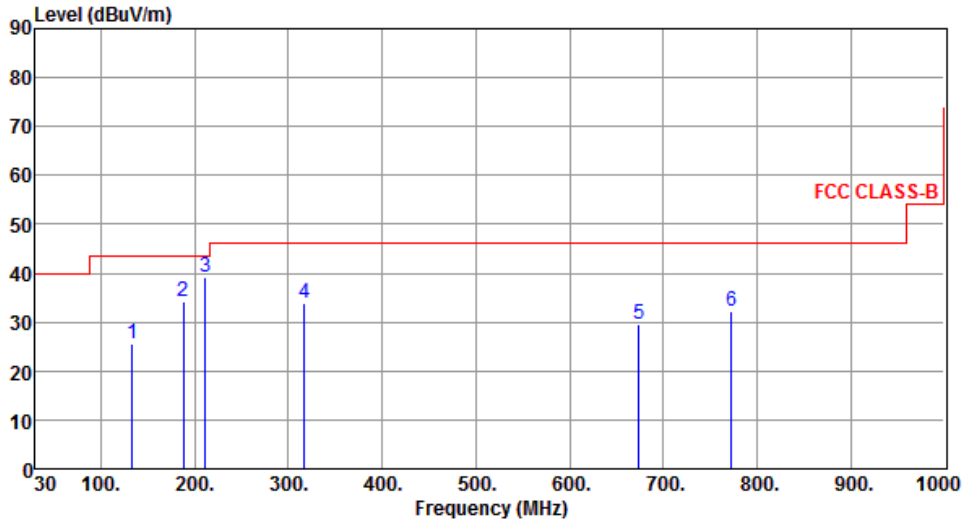


Radiated Emissions above 1 GHz



3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

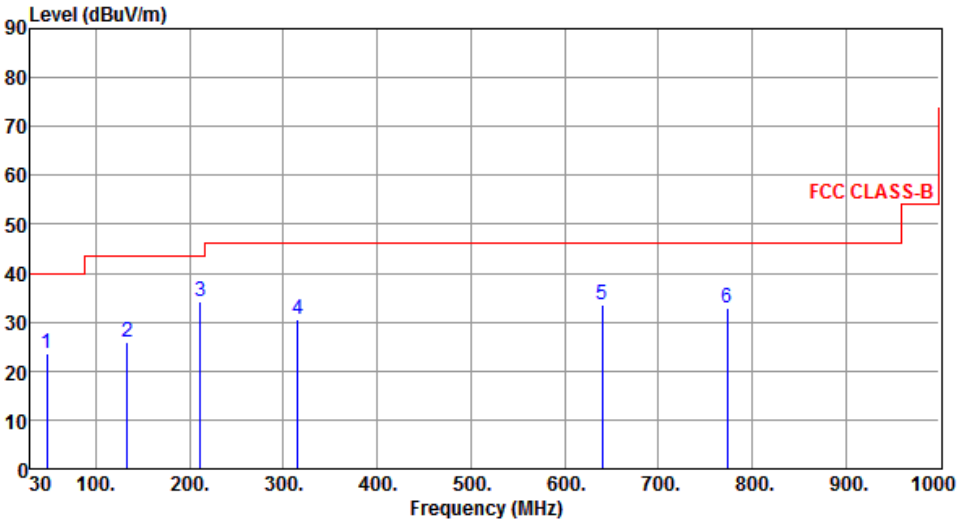
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	133.79	25.65	43.50	-17.85	43.27	-17.62	Peak	---	---
2	188.11	34.34	43.50	-9.16	53.30	-18.96	Peak	---	---
3	211.39	39.09	43.50	-4.41	58.45	-19.36	Peak	---	---
4	317.12	34.02	46.00	-11.98	49.53	-15.51	Peak	---	---
5	674.08	29.45	46.00	-16.55	37.91	-8.46	Peak	---	---
6	773.02	32.26	46.00	-13.74	39.14	-6.88	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

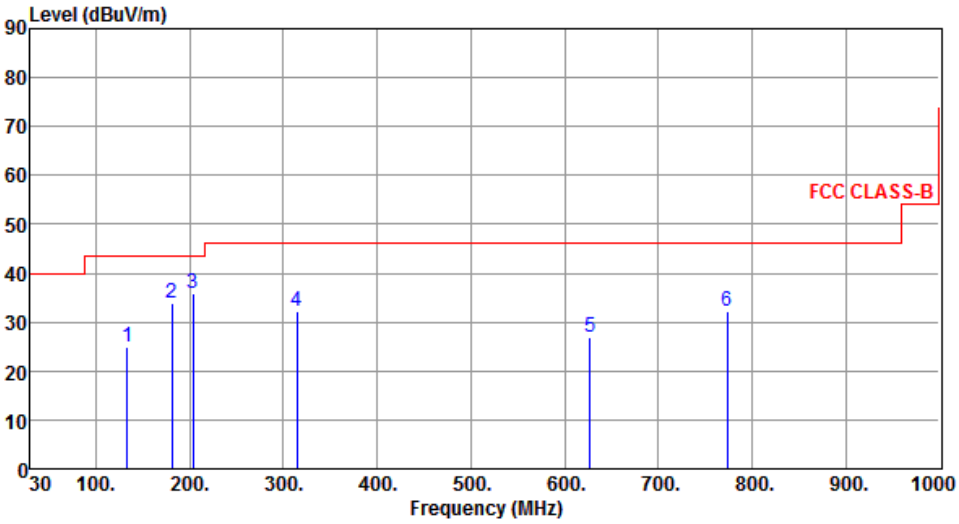
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	47.46	23.51	40.00	-16.49	39.81	-16.30	Peak	---	---
2	133.79	25.94	43.50	-17.56	43.56	-17.62	Peak	---	---
3	211.39	34.06	43.50	-9.44	53.42	-19.36	Peak	---	---
4	315.18	30.54	46.00	-15.46	46.10	-15.56	Peak	---	---
5	640.13	33.49	46.00	-12.51	42.41	-8.92	Peak	---	---
6	773.99	32.92	46.00	-13.08	39.80	-6.88	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

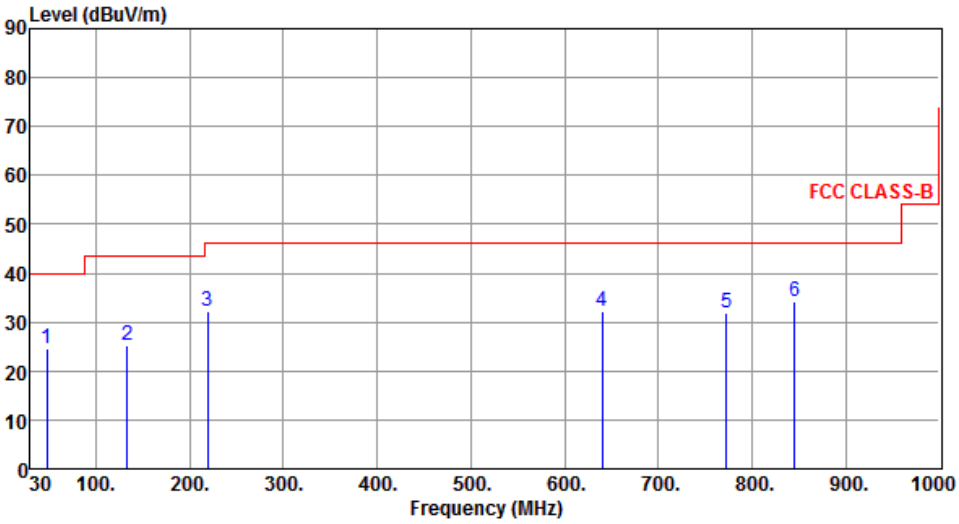
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	133.79	25.00	43.50	-18.50	42.62	-17.62	Peak	---	---
2	181.32	33.82	43.50	-9.68	52.06	-18.24	Peak	---	---
3	203.63	35.85	43.50	-7.65	55.21	-19.36	Peak	---	---
4	314.21	32.36	46.00	-13.64	47.93	-15.57	Peak	---	---
5	627.52	27.02	46.00	-18.98	36.16	-9.14	Peak	---	---
6	773.99	32.14	46.00	-13.86	39.02	-6.88	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

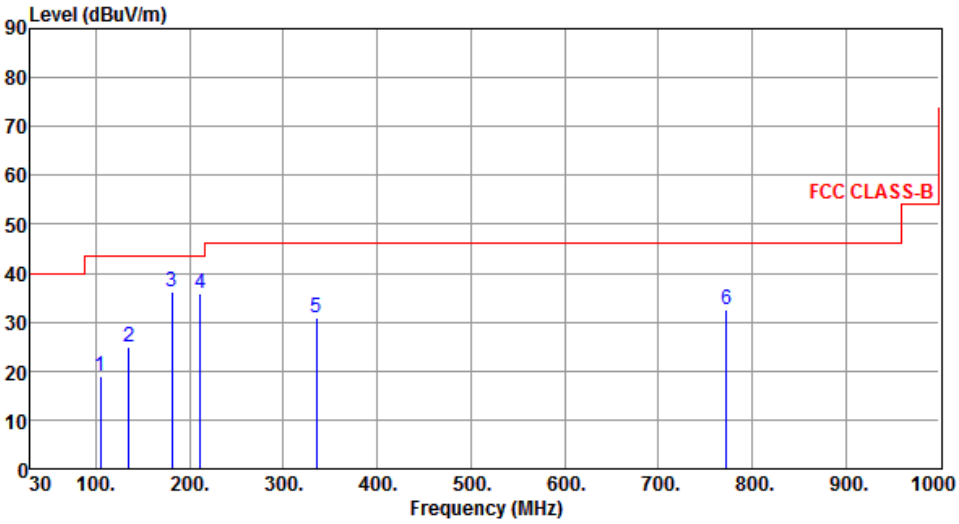
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	47.46	24.57	40.00	-15.43	40.87	-16.30	Peak	---	---
2	133.79	25.27	43.50	-18.23	42.89	-17.62	Peak	---	---
3	219.15	32.34	46.00	-13.66	51.45	-19.11	Peak	---	---
4	640.13	32.32	46.00	-13.68	41.24	-8.92	Peak	---	---
5	773.02	31.84	46.00	-14.16	38.72	-6.88	Peak	---	---
6	845.77	34.07	46.00	-11.93	40.14	-6.07	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

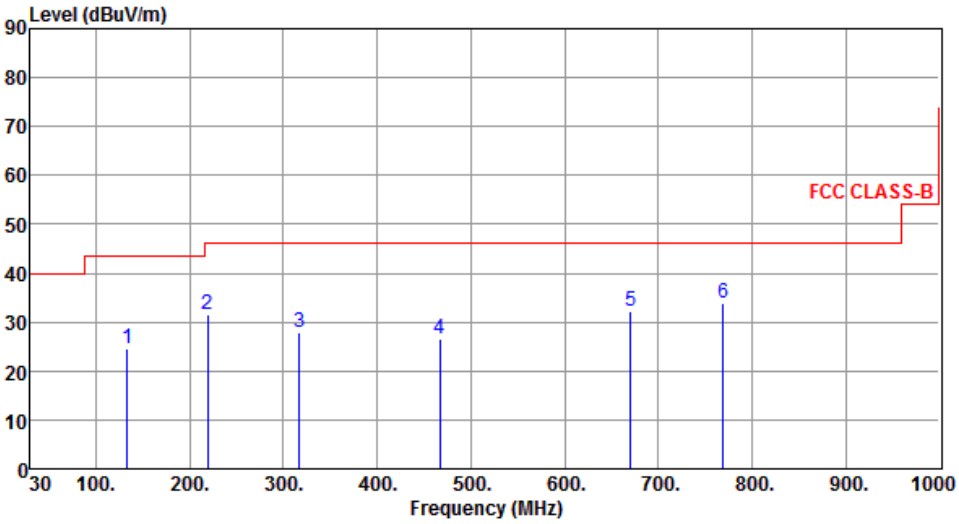
Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	104.69	18.80	43.50	-24.70	39.30	-20.50	Peak	---	---
2	134.76	24.84	43.50	-18.66	42.36	-17.52	Peak	---	---
3	181.32	36.30	43.50	-7.20	54.54	-18.24	Peak	---	---
4	211.39	35.92	43.50	-7.58	55.28	-19.36	Peak	---	---
5	335.55	30.93	46.00	-15.07	46.09	-15.16	Peak	---	---
6	773.02	32.48	46.00	-13.52	39.36	-6.88	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

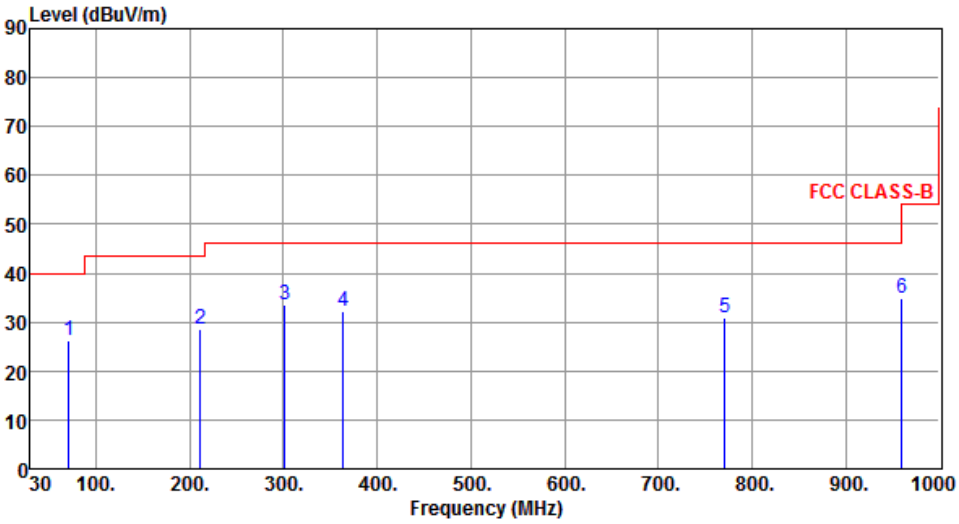
Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	133.79	24.55	43.50	-18.95	42.17	-17.62	Peak	---	---
2	219.15	31.60	46.00	-14.40	50.71	-19.11	Peak	---	---
3	317.12	27.80	46.00	-18.20	43.31	-15.51	Peak	---	---
4	466.50	26.60	46.00	-19.40	38.51	-11.91	Peak	---	---
5	670.20	32.15	46.00	-13.85	40.66	-8.51	Peak	---	---
6	769.14	33.91	46.00	-12.09	40.83	-6.92	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

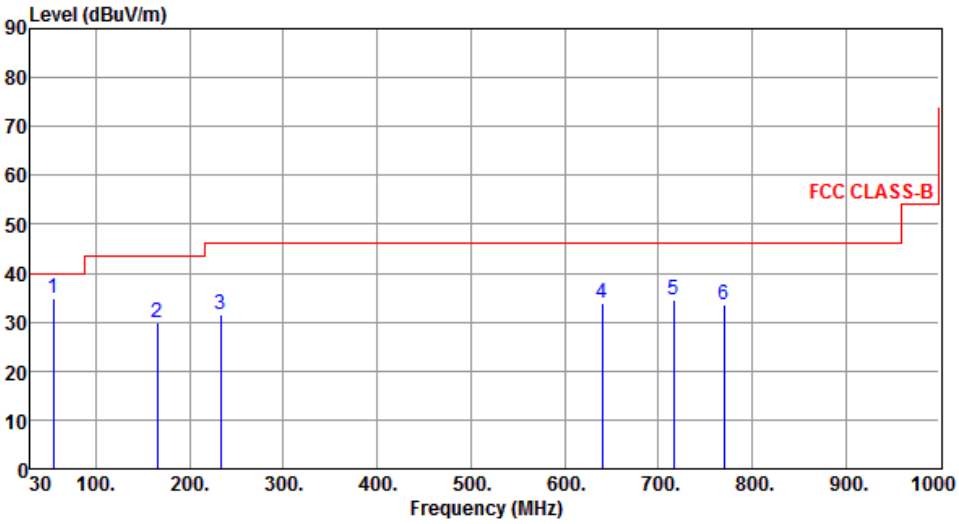
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Polarization	Horizontal	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	70.74	26.26	40.00	-13.74	45.74	-19.48	Peak	---	---
2	211.39	28.52	43.50	-14.98	47.88	-19.36	Peak	---	---
3	301.60	33.50	46.00	-12.50	49.32	-15.82	Peak	---	---
4	363.68	32.36	46.00	-13.64	46.85	-14.49	Peak	---	---
5	771.08	30.90	46.00	-15.10	37.79	-6.89	Peak	---	---
6	960.23	34.88	54.00	-19.12	39.42	-4.54	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

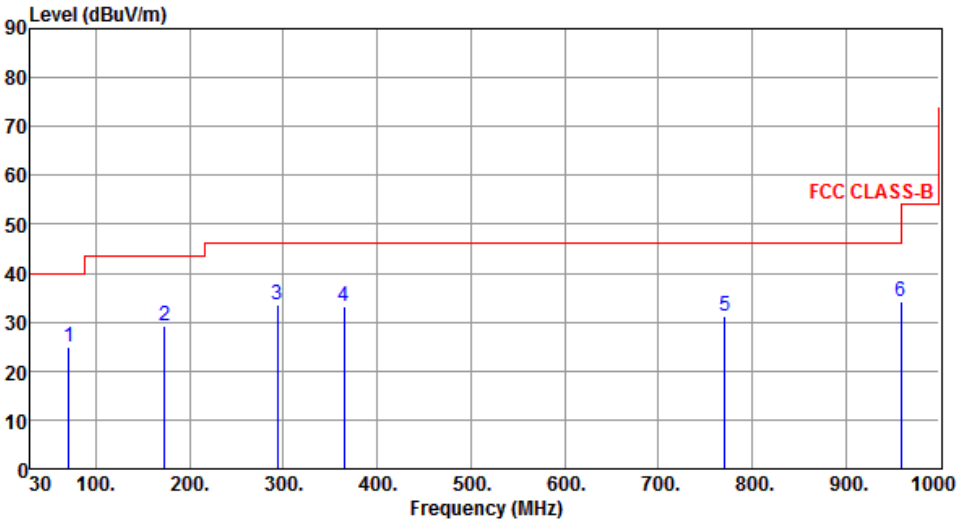
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Polarization	Vertical	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	54.25	34.90	40.00	-5.10	51.72	-16.82	Peak	---	---
2	165.80	29.76	43.50	-13.74	46.74	-16.98	Peak	---	---
3	232.73	31.39	46.00	-14.61	49.87	-18.48	Peak	---	---
4	640.13	34.02	46.00	-11.98	42.94	-8.92	Peak	---	---
5	716.76	34.57	46.00	-11.43	42.37	-7.80	Peak	---	---
6	770.11	33.50	46.00	-12.50	40.40	-6.90	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

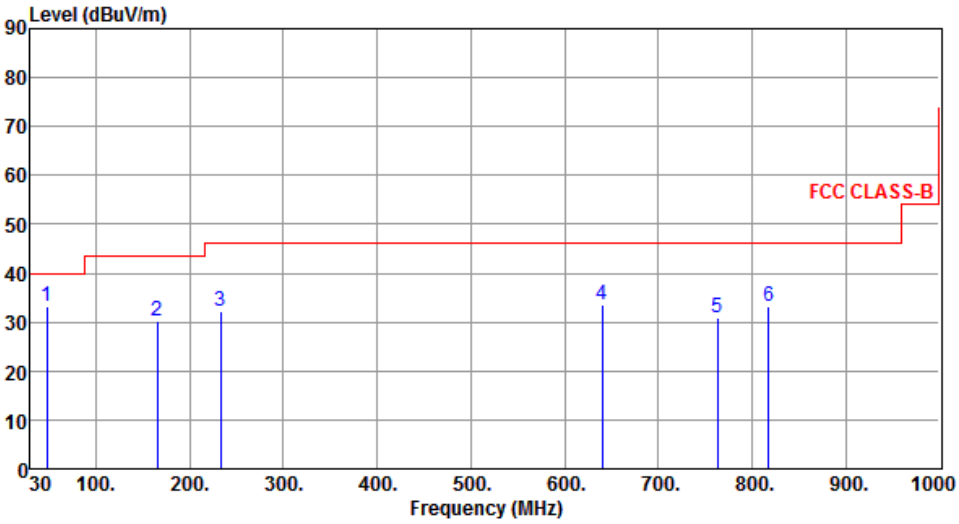
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Polarization	Horizontal	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	70.74	25.00	40.00	-15.00	44.48	-19.48	Peak	---	---
2	173.56	29.08	43.50	-14.42	46.56	-17.48	Peak	---	---
3	293.84	33.47	46.00	-12.53	49.51	-16.04	Peak	---	---
4	364.65	33.21	46.00	-12.79	47.68	-14.47	Peak	---	---
5	771.08	31.32	46.00	-14.68	38.21	-6.89	Peak	---	---
6	959.26	34.35	46.00	-11.65	38.89	-4.54	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

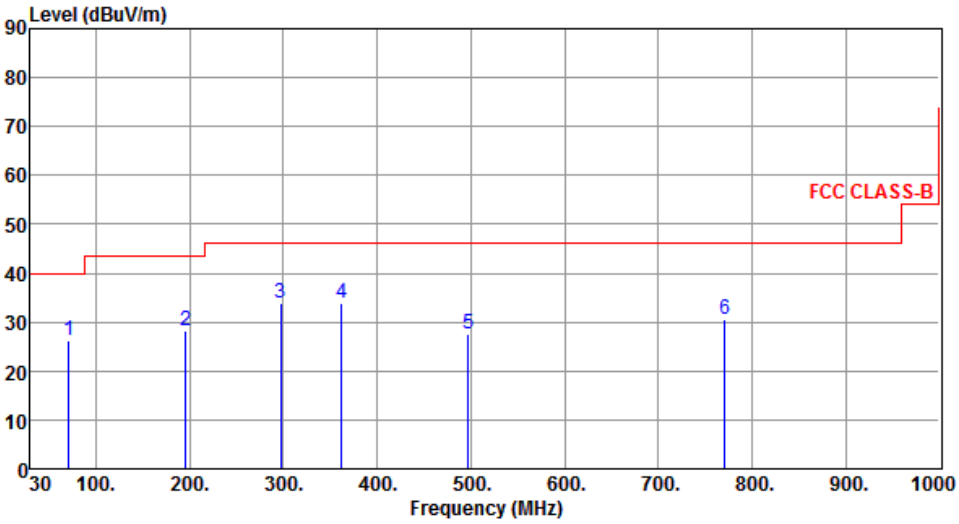
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Polarization	Vertical	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	47.46	33.14	40.00	-6.86	49.44	-16.30	Peak	---	---
2	165.80	30.37	43.50	-13.13	47.35	-16.98	Peak	---	---
3	232.73	32.14	46.00	-13.86	50.62	-18.48	Peak	---	---
4	640.13	33.59	46.00	-12.41	42.51	-8.92	Peak	---	---
5	763.32	31.03	46.00	-14.97	38.00	-6.97	Peak	---	---
6	817.64	33.17	46.00	-12.83	39.59	-6.42	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

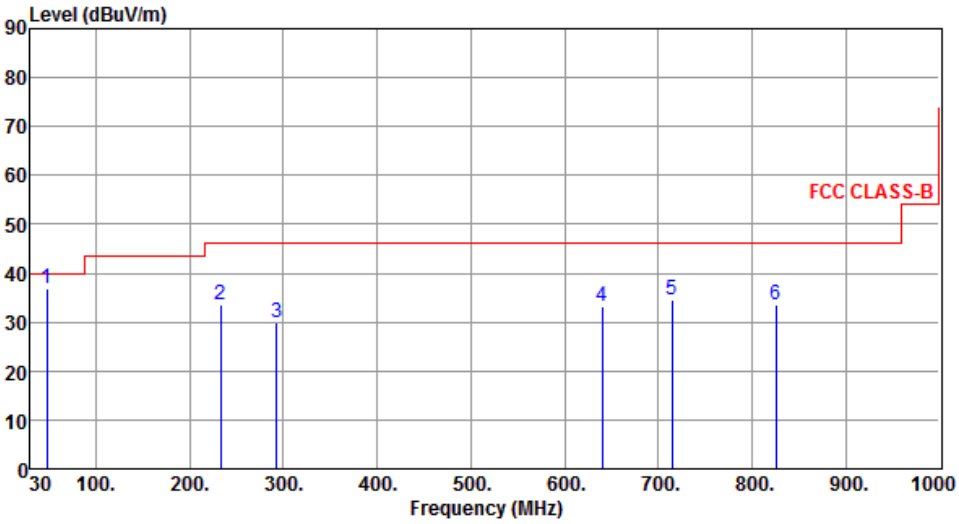
Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Polarization	Horizontal	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	70.74	26.17	40.00	-13.83	45.65	-19.48	Peak	---	---
2	195.87	28.28	43.50	-15.22	47.54	-19.26	Peak	---	---
3	296.75	33.82	46.00	-12.18	49.78	-15.96	Peak	---	---
4	361.74	33.83	46.00	-12.17	48.38	-14.55	Peak	---	---
5	497.54	27.63	46.00	-18.37	38.89	-11.26	Peak	---	---
6	771.08	30.67	46.00	-15.33	37.56	-6.89	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Polarization	Vertical	Test Configuration	2

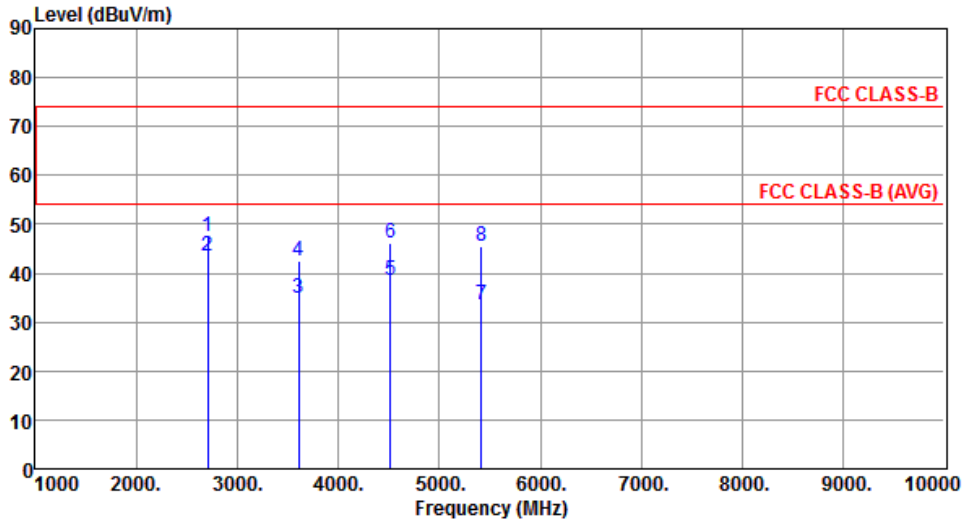


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	47.46	36.96	40.00	-3.04	53.26	-16.30	Peak	---	---
2	232.73	33.52	46.00	-12.48	52.00	-18.48	Peak	---	---
3	292.87	29.72	46.00	-16.28	45.80	-16.08	Peak	---	---
4	640.13	33.27	46.00	-12.73	42.19	-8.92	Peak	---	---
5	714.82	34.70	46.00	-11.30	42.54	-7.84	Peak	---	---
6	825.40	33.66	46.00	-12.34	39.99	-6.33	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.2.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

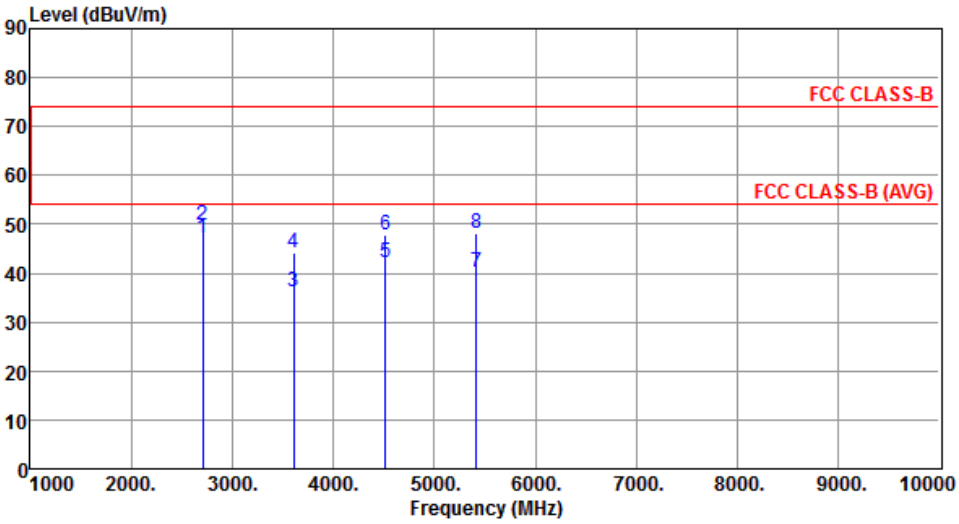
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2706.90	47.66	54.00	-6.34	49.54	-1.88	Average	147	217
2	2706.90	43.62	54.00	-10.38	45.50	-1.88	Average	147	217
3	3609.20	34.96	54.00	-19.04	34.97	-0.01	Average	151	52
4	3609.20	42.66	74.00	-31.34	42.67	-0.01	Peak	151	52
5	4511.50	38.36	54.00	-15.64	34.73	3.63	Average	151	196
6	4511.50	46.02	74.00	-27.98	42.39	3.63	Peak	151	196
7	5413.80	33.59	54.00	-20.41	27.89	5.70	Average	153	212
8	5413.80	45.62	74.00	-28.38	39.92	5.70	Peak	153	212

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

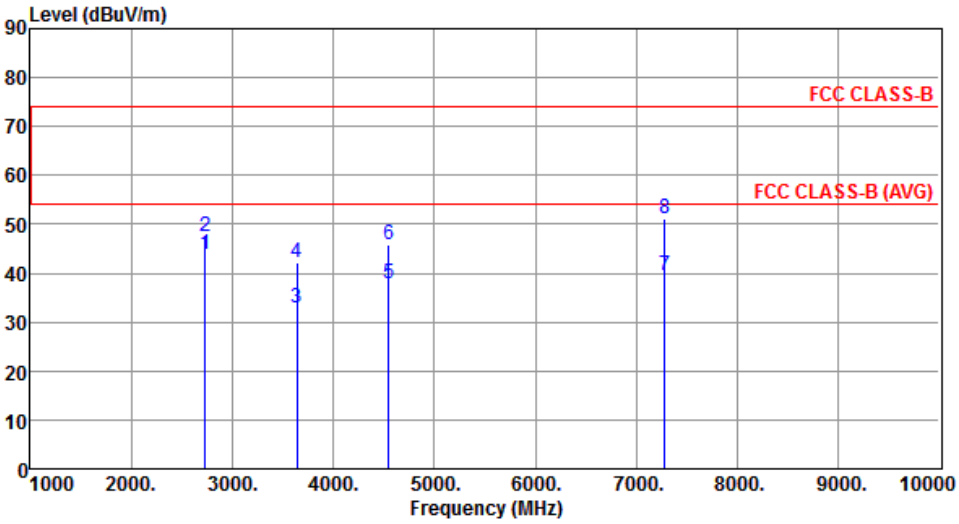
Modulation / SF	CSS / 10	Test Freq. (MHz)	902.3
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2706.90	47.22	54.00	-6.78	49.10	-1.88	Average	144	172
2	2706.90	49.81	74.00	-24.19	51.69	-1.88	Peak	144	172
3	3609.20	36.32	54.00	-17.68	36.33	-0.01	Average	124	24
4	3609.20	44.09	74.00	-29.91	44.10	-0.01	Peak	124	24
5	4511.50	42.09	54.00	-11.91	38.46	3.63	Average	146	356
6	4511.50	47.91	74.00	-26.09	44.28	3.63	Peak	146	356
7	5413.80	40.27	54.00	-13.73	34.57	5.70	Average	163	0
8	5413.80	48.20	74.00	-25.80	42.50	5.70	Peak	163	0

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

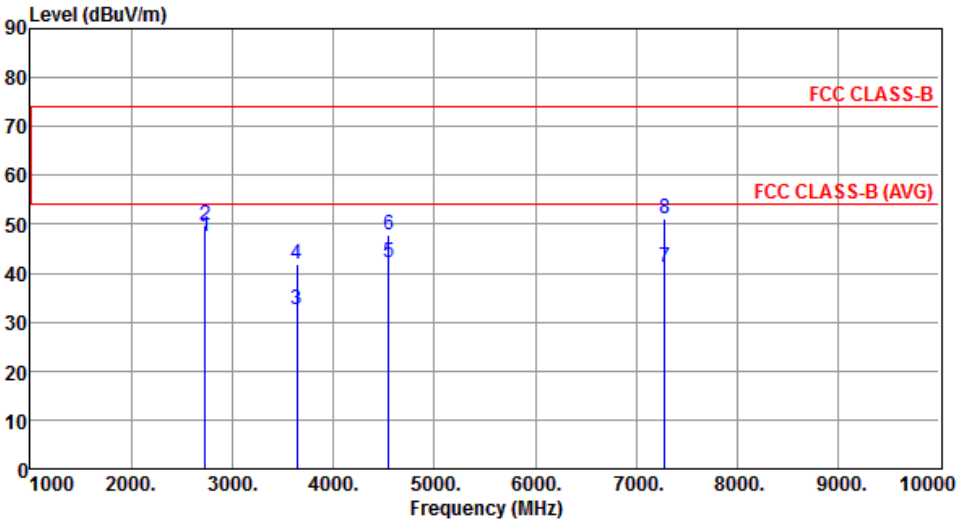
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2730.30	43.70	54.00	-10.30	45.49	-1.79	Average	145	217
2	2730.30	47.36	74.00	-26.64	49.15	-1.79	Peak	145	217
3	3640.40	32.99	54.00	-21.01	32.81	0.18	Average	146	45
4	3640.40	42.27	74.00	-31.73	42.09	0.18	Peak	146	45
5	4550.50	37.77	54.00	-16.23	33.93	3.84	Average	120	194
6	4550.50	45.97	74.00	-28.03	42.13	3.84	Peak	120	194
7	7280.80	39.49	54.00	-14.51	30.07	9.42	Average	118	45
8	7280.80	51.30	74.00	-22.70	41.88	9.42	Peak	118	45

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

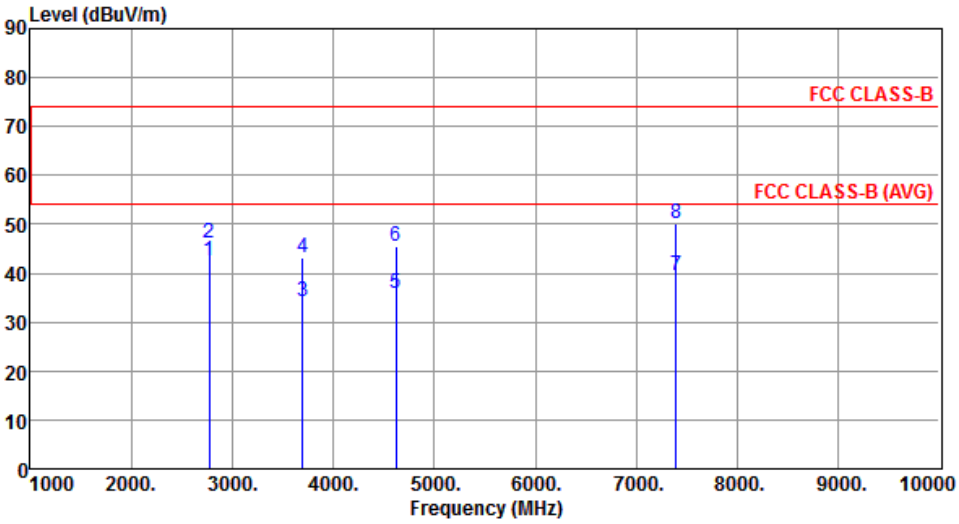
Modulation / SF	CSS / 10	Test Freq. (MHz)	910.1
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2730.30	47.41	54.00	-6.59	49.20	-1.79	Average	127	347
2	2730.30	49.74	74.00	-24.26	51.53	-1.79	Peak	127	347
3	3640.40	32.63	54.00	-21.37	32.45	0.18	Average	136	17
4	3640.40	41.80	74.00	-32.20	41.62	0.18	Peak	136	17
5	4550.50	42.14	54.00	-11.86	38.30	3.84	Average	146	357
6	4550.50	47.90	74.00	-26.10	44.06	3.84	Peak	146	357
7	7280.80	41.12	54.00	-12.88	31.70	9.42	Average	223	7
8	7280.80	51.09	74.00	-22.91	41.67	9.42	Peak	223	7

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

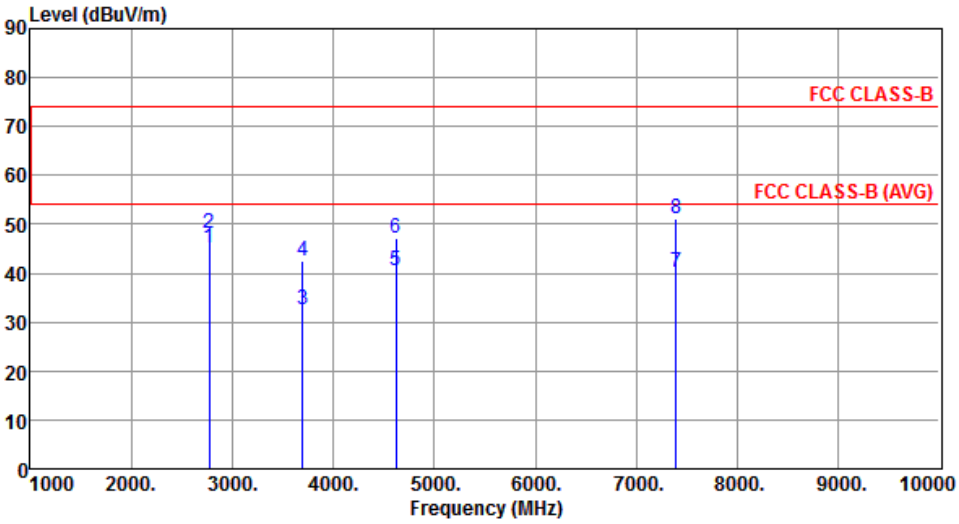
Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2773.13	42.46	54.00	-11.54	44.10	-1.64	Average	163	158
2	2773.13	46.32	74.00	-27.68	47.96	-1.64	Peak	163	158
3	3697.50	34.10	54.00	-19.90	33.55	0.55	Average	164	44
4	3697.50	43.25	74.00	-30.75	42.70	0.55	Peak	164	44
5	4621.88	36.02	54.00	-17.98	31.85	4.17	Average	107	215
6	4621.88	45.44	74.00	-28.56	41.27	4.17	Peak	107	215
7	7395.00	39.50	54.00	-14.50	29.87	9.63	Average	133	20
8	7395.00	50.28	74.00	-23.72	40.65	9.63	Peak	133	20

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation / SF	CSS / 10	Test Freq. (MHz)	924.375
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2773.13	45.31	54.00	-8.69	46.95	-1.64	Average	112	341
2	2773.13	48.20	74.00	-25.80	49.84	-1.64	Peak	112	341
3	3697.50	32.47	54.00	-21.53	31.92	0.55	Average	112	356
4	3697.50	42.40	74.00	-31.60	41.85	0.55	Peak	112	356
5	4621.88	40.40	54.00	-13.60	36.23	4.17	Average	133	353
6	4621.88	47.07	74.00	-26.93	42.90	4.17	Peak	133	353
7	7395.00	40.17	54.00	-13.83	30.54	9.63	Average	112	25
8	7395.00	51.28	74.00	-22.72	41.65	9.63	Peak	112	25

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.3 Unwanted Emissions into Non-Restricted Frequency Bands

3.3.1 Limit of Unwanted Emissions into Non-Restricted Frequency Bands

The peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.3.2 Test Procedures

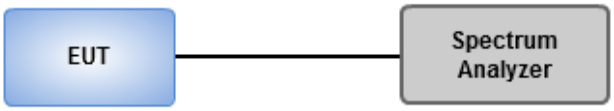
Reference Level Measurement

1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Set Sweep time = auto couple, Trace mode = max hold.
3. Allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

Unwanted Emissions Level Measurement

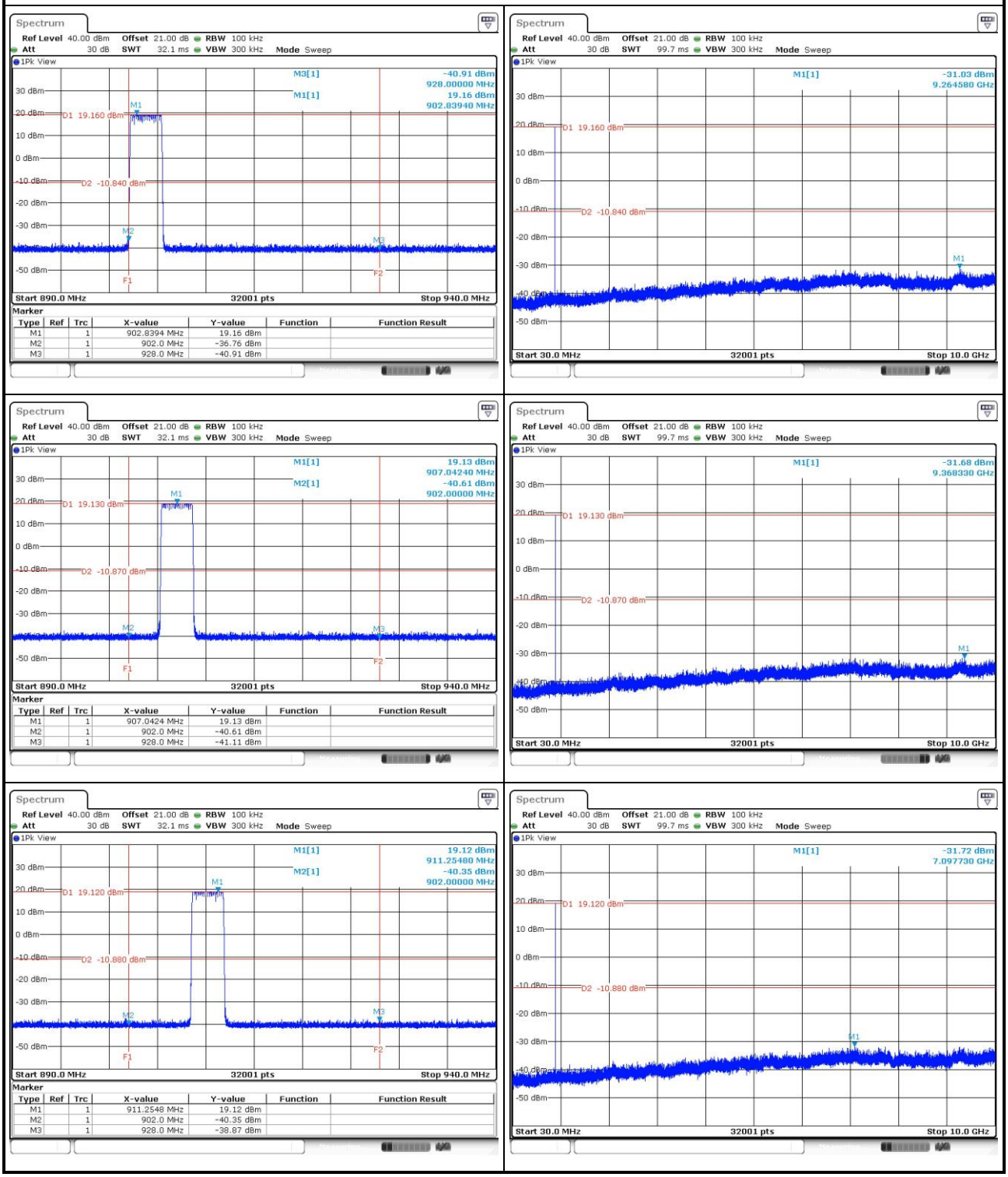
1. Set RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Trace Mode = max hold, Sweep = auto couple.
3. Allow the trace to stabilize.
4. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

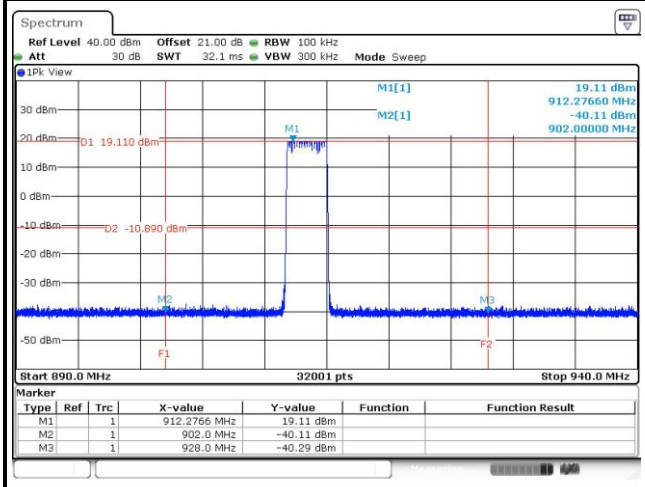
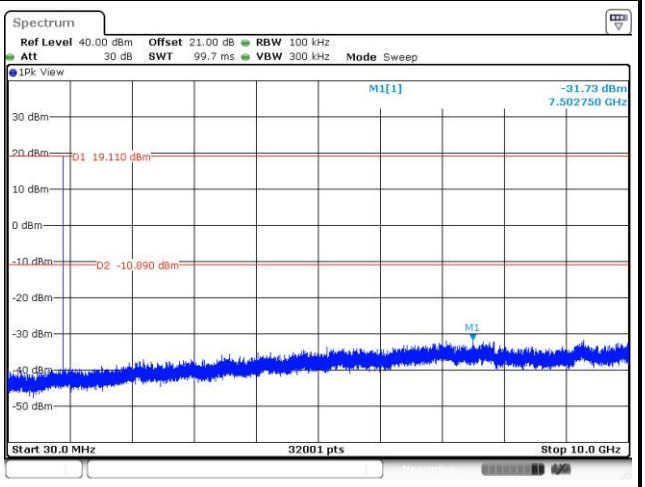
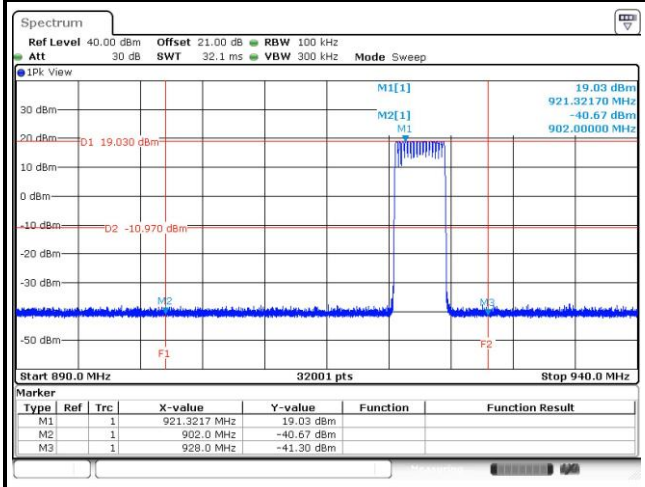
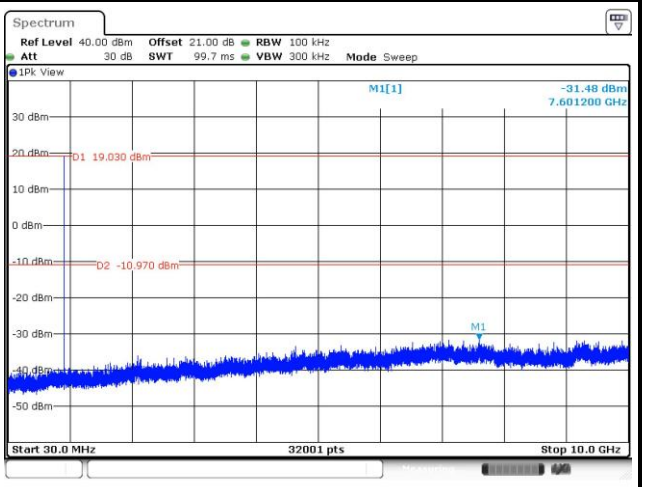
3.3.3 Test Setup



3.3.4 Unwanted Emissions into Non-Restricted Frequency Bands

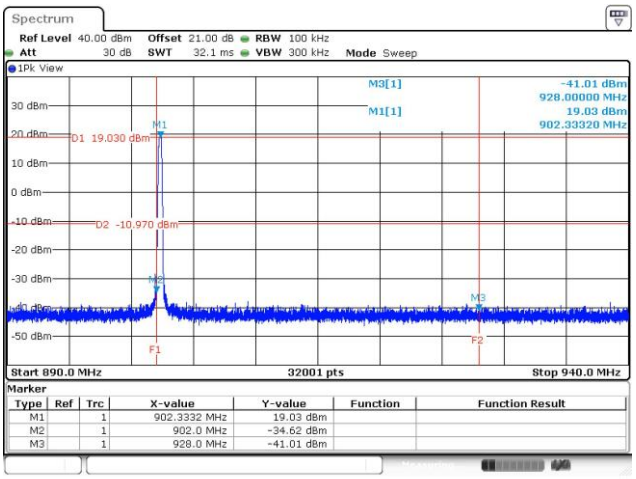
Hopping on (Group 1 / 2 / 3)
30MHz~10GHz (down 30dBc)

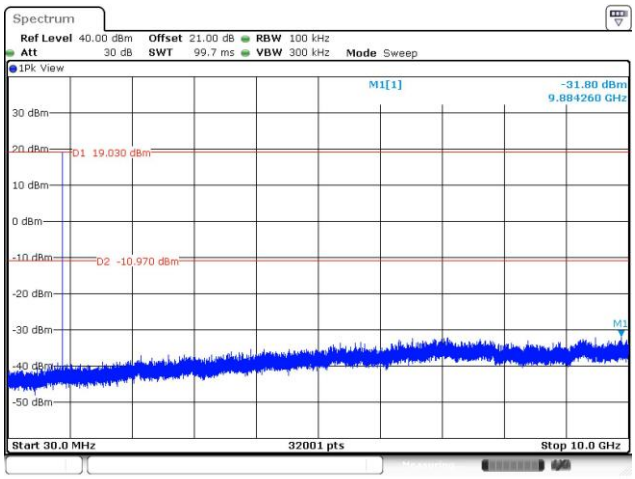


Hopping on (Group 4 / 5)	
30MHz~10GHz (down 30dBc)	
	
	
-	-

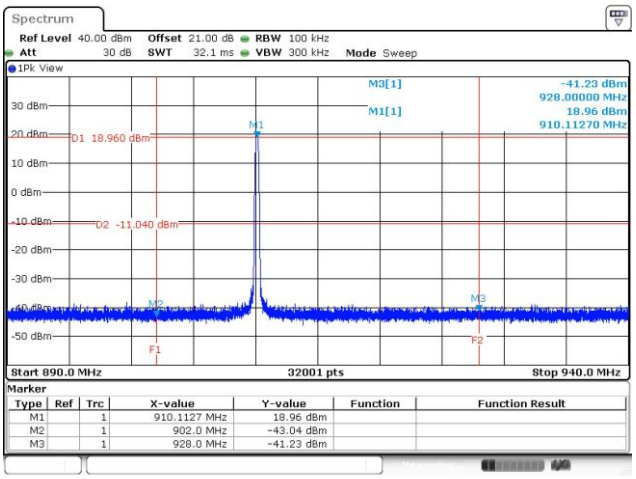
Hopping off (Low / Middle / High channel)

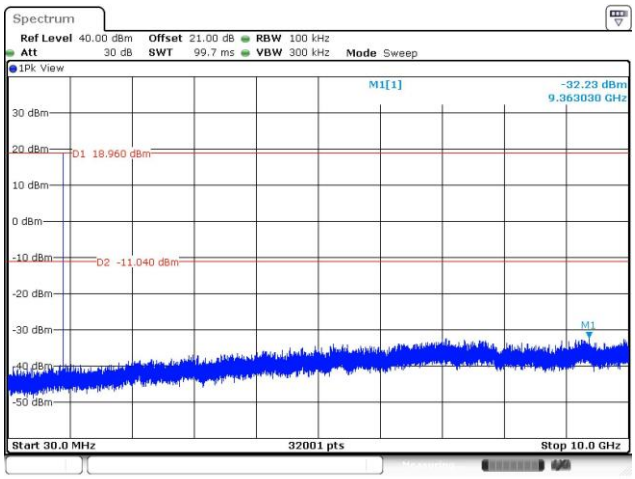
TX Freq 902.3MHz / 30MHz~10GHz (down 30dBc)



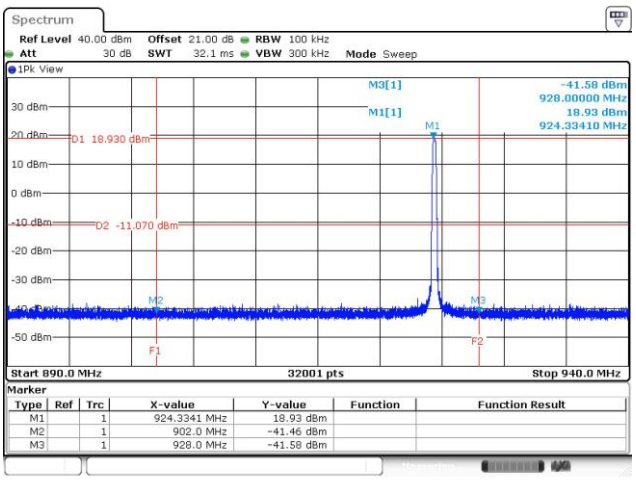


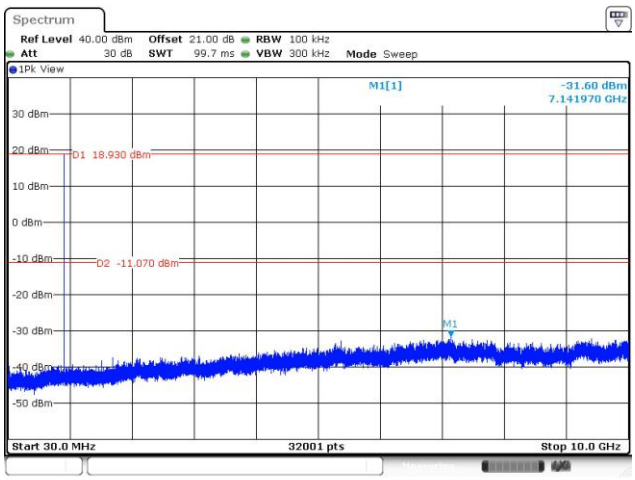
TX Freq 910.1MHz / 30MHz~10GHz (down 30dBc)





TX Freq 924.375MHz / 30MHz~10GHz (down 30dBc)





3.4 Conducted Output Power

3.4.1 Limit of Conducted Output Power

☒ 1 Watt, systems employing at least 50 hopping channels;

☐ 0.25 Watt, for systems employing less than 50 hopping channels, but at least 25 hopping channels,

3.4.2 Test Procedures

1. A wideband power meter is used for power measurement. Bandwidth of power senor and meter is 50MHz

2 If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power

3.4.3 Test Setup

3.4.4 Test Result of Conducted Output Power

Modulation / SF	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Limit (W)
CSS / 10	902.3	91.41	19.61	1
CSS / 10	910.1	91.20	19.60	1
CSS / 10	924.375	90.36	19.56	1

3.5 Number of Hopping Frequency

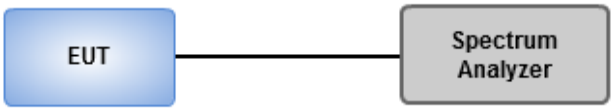
3.5.1 Limit of Number of Hopping Frequency

Number of Hopping Frequencies Limit for Frequency Hopping Systems	
☒	902-928 MHz Band:
	☐ N ≥ 50, 20 dB bandwidth of the hopping channel is less than 250 kHz
	☐ N ≥ 25, 20 dB bandwidth of the hopping channel is 250 kHz or greater
	☒ No minimum number of hopping channels associated with hybrid system.
N: Number of Hopping Frequencies	

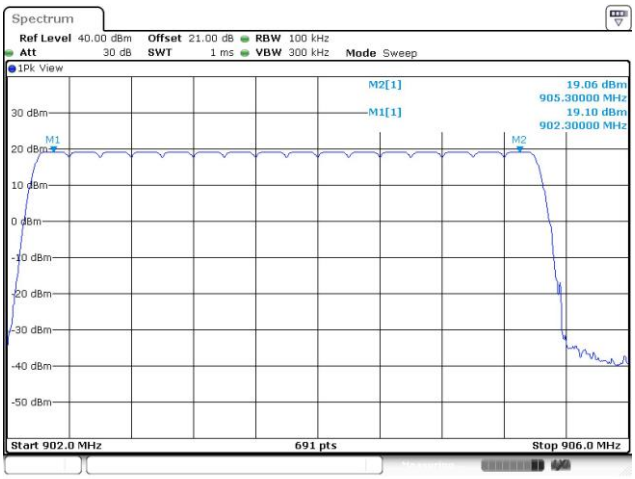
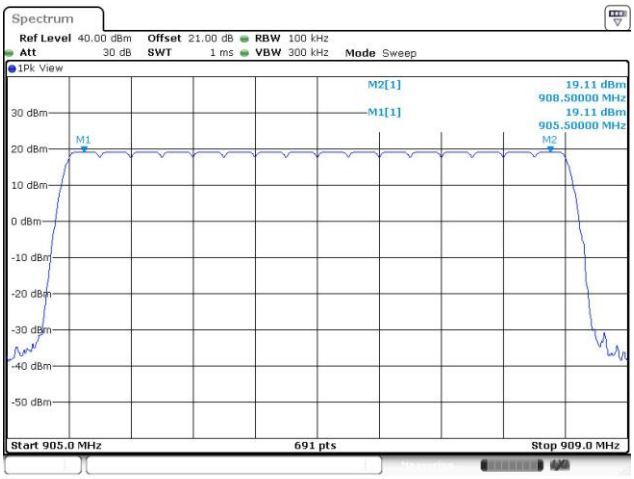
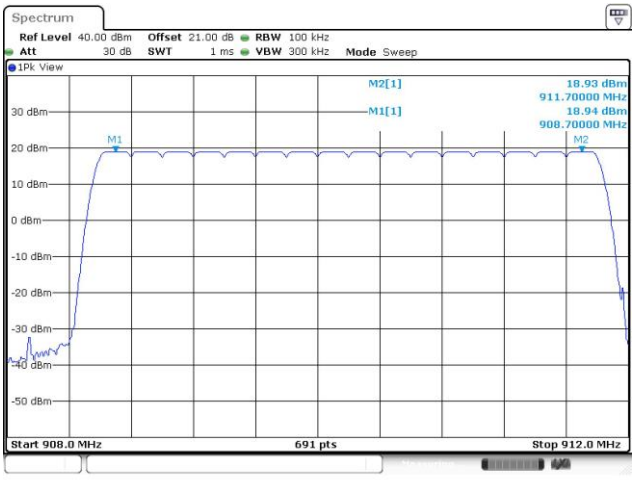
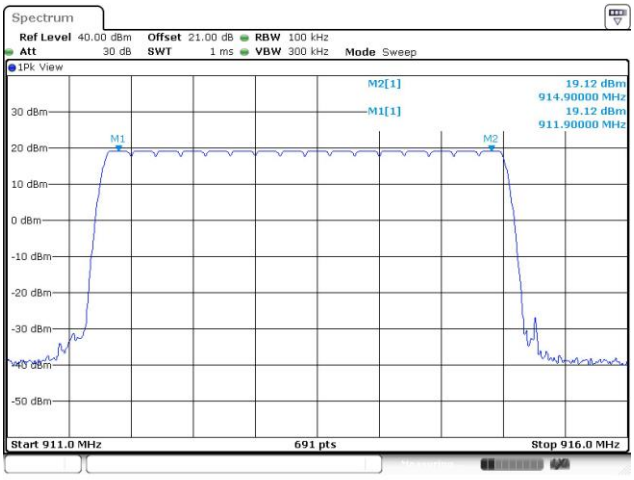
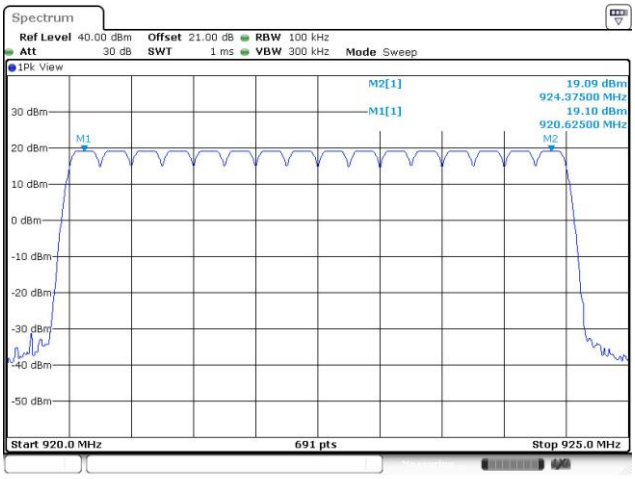
3.5.2 Test Procedures

1. Set RBW = 100kHz, VBW = 300kHz, Sweep time = Auto, Detector = Peak Trace max hold.
2 Allow trace to stabilize.

3.5.3 Test Setup



3.5.4 Test Result of Number of Hopping Frequency

Group 1 / 3 / 5	Group 2 / 4
	
	
	

3.6 20dB and Occupied Bandwidth

3.6.1 Test Procedures

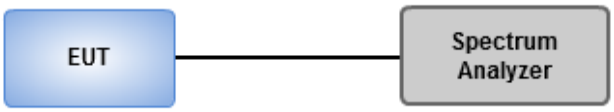
20dB Bandwidth

1. Set RBW=3kHz, VBW=10kHz, Sweep time=Auto, Detector=Peak Trace max hold.
2 Allow trace to stabilize.
3 Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

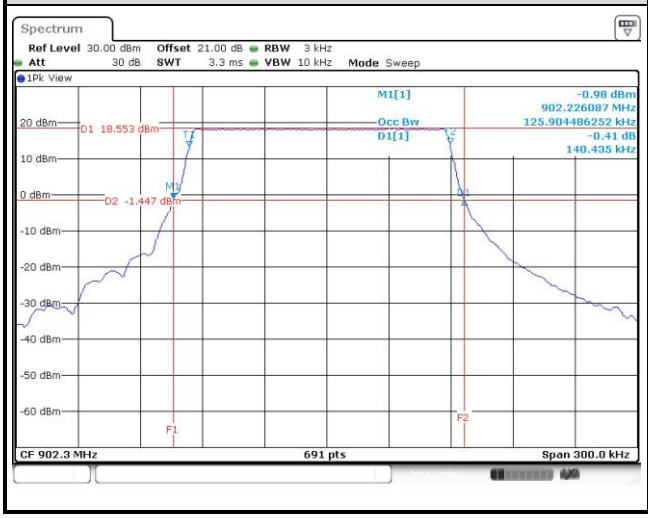
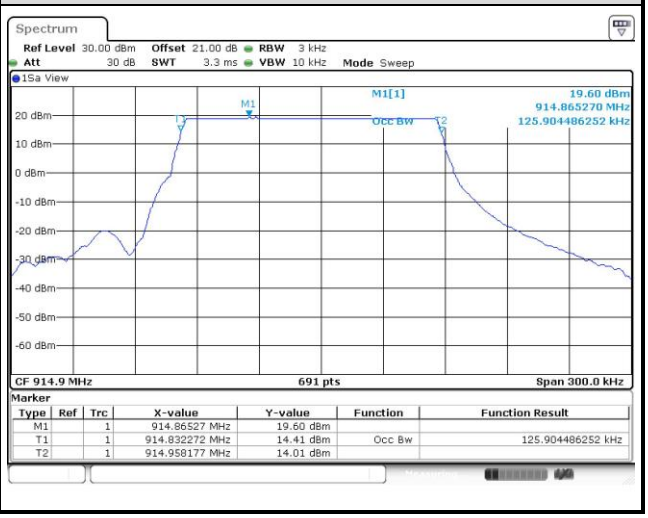
1. Set RBW=3kHz, VBW=10kHz,Sweep time = Auto, Detector=Sample, Trace max hold
2 Allow trace to stabilize
3. Use Occupied bandwidth function of spectrum analyzer to measuring 99% occupied bandwidth

3.6.2 Test Setup



3.6.3 Test result of 20dB and Occupied Bandwidth

Modulation / SF	Freq. (MHz)	20dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
CSS / 10	902.3	0.140	0.125
CSS / 10	910.1	0.138	0.125
CSS / 10	914.9	0.137	0.126
CSS / 10	920.625	0.138	0.125
CSS / 10	924.375	0.139	0.126

Worst Plot of 20dB Bandwidth	Worst Plot of Occupied Bandwidth
	

3.7 Channel Separation

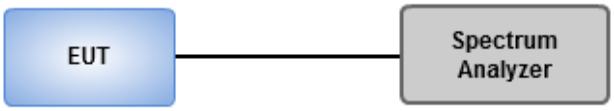
3.7.1 Limit of Channel Separation

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

3.7.2 Test Procedures

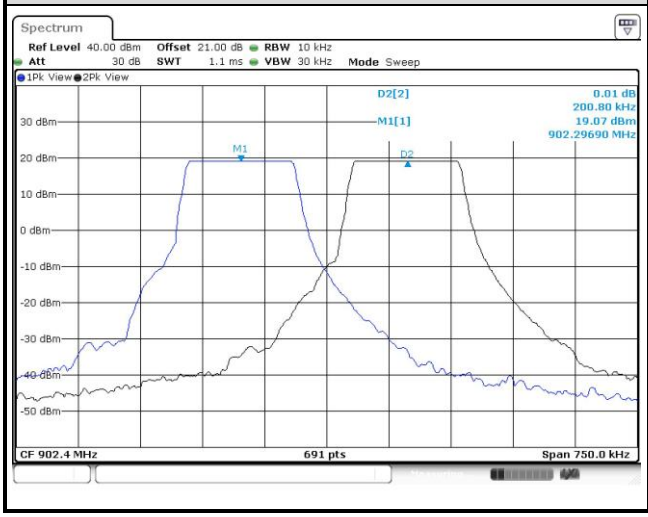
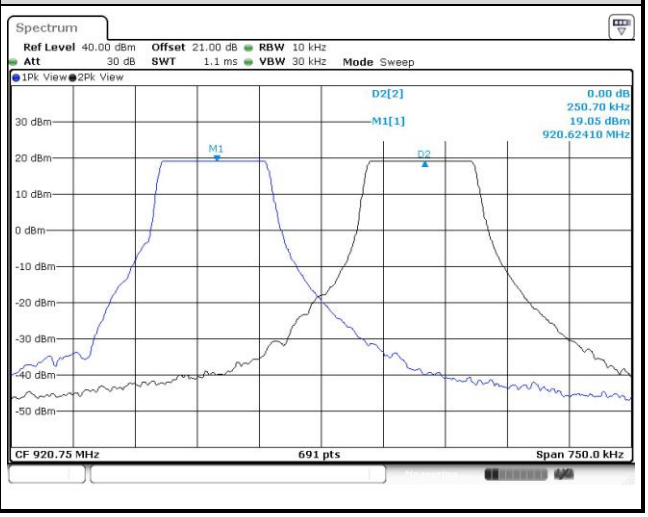
1. Set RBW=10kHz, VBW=30kHz, Sweep time=Auto, Detector=Peak Trace max hold.
2 Allow trace to stabilize.
3 Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The EUT shall show compliance with the appropriate regulatory limit

3.7.3 Test Setup



3.7.4 Test result of Channel Separation

Modulation / SF	Freq. (MHz)	Channel Separation (MHz)	20dB Bandwidth (MHz)	Pass/Fail
CSS / 10	902.3	0.20080	0.140	Pass
CSS / 10	910.1	0.20080	0.138	Pass
CSS / 10	914.9	0.20080	0.137	Pass
CSS / 10	920.625	0.25070	0.138	Pass
CSS / 10	924.375	0.25070	0.139	Pass

Worst Plot of 200 kHz channel spacing	Worst Plot of 250 kHz channel spacing
	

3.8 Number of Dwell Time

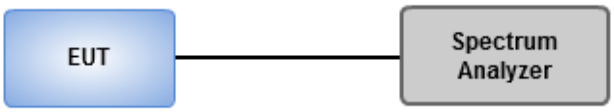
3.8.1 Limit of Dwell time

Time of Occupancy (Dwell Time) Limit for Frequency Hopping Systems		
☒	902-928 MHz Band:	
	☐	≤ 0.4 second within a 20 second period, 20 dB bandwidth of the hopping channel is less than 250 kHz
	☐	≤ 0.4 second within a 10 second period, 20 dB bandwidth of the hopping channel is 250 kHz or greater
	☒	an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4

3.8.2 Test Procedures

1. Set RBW=100kHz, VBW=300kHz, Sweep time=6.4s / 500ms, Detector=Peak, Span=0Hz,Trace max hold.
2. Measure and record the burst on time.

3.8.3 Test Setup

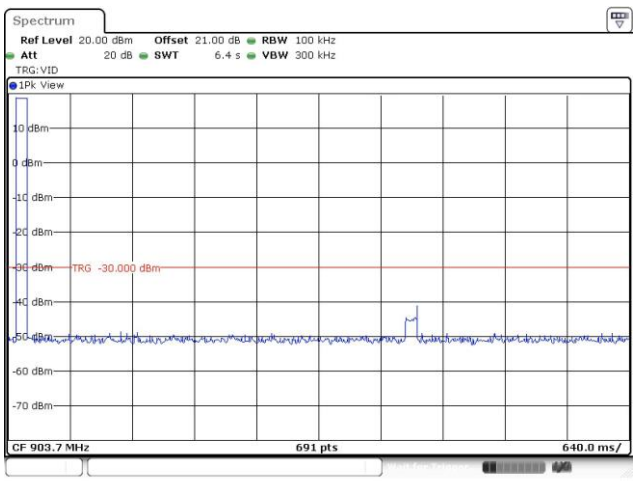


3.8.4 Test Result of Dwell Time

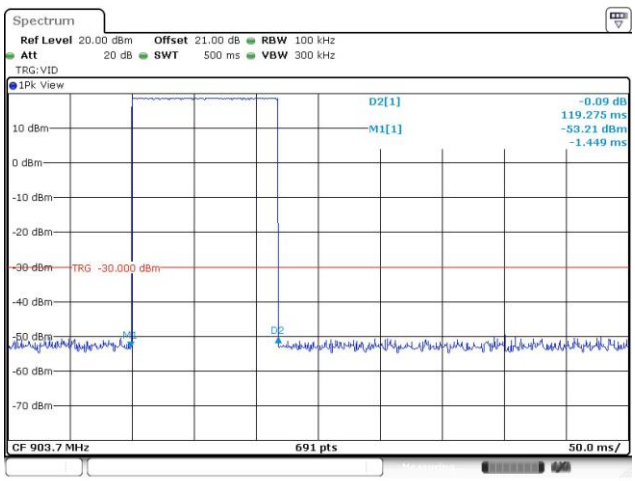
Modulation / SF	Freq. (MHz)	Length of Transmission Time (msec)	Number of Transmission in a 6.4 (16 Hopping*0.4)	Result (s)	Limit (s)
CSS / 7	903.7	0.11928	1	0.11928	0.4
CSS / 8	903.7	0.21739	1	0.21739	0.4
CSS / 9	903.7	0.37261	1	0.37261	0.4
CSS / 10	903.7	0.39203	1	0.39203	0.4
CSS / 10	906.9	0.39203	1	0.39203	0.4
CSS / 10	910.1	0.39203	1	0.39203	0.4
CSS / 10	913.3	0.39203	1	0.39203	0.4
CSS / 10	922.375	0.39203	1	0.39203	0.4

Frequency: 903.7 MHz

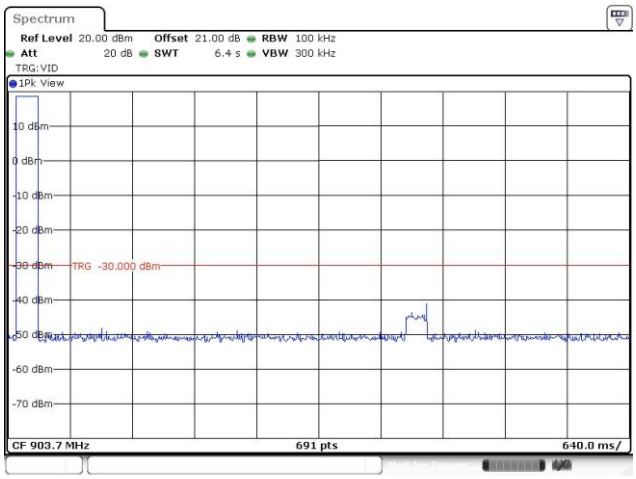
SF: 7



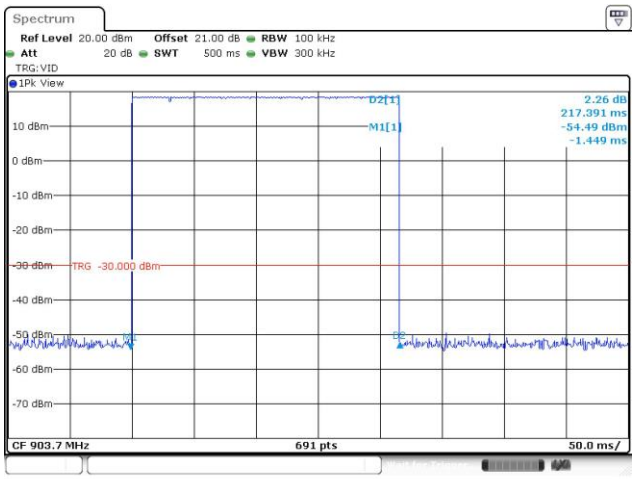
SF: 7

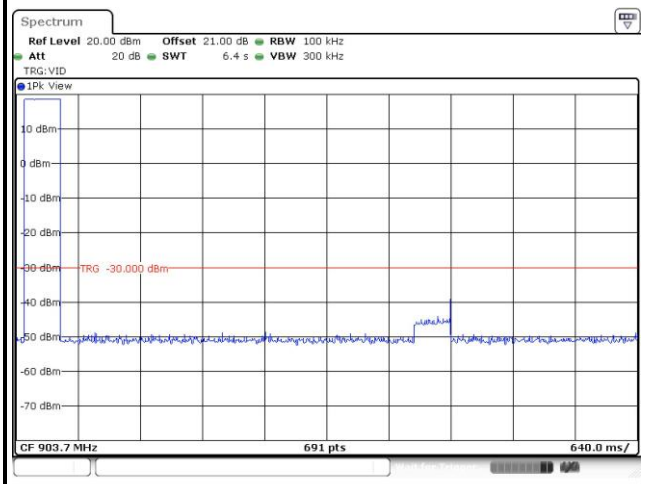
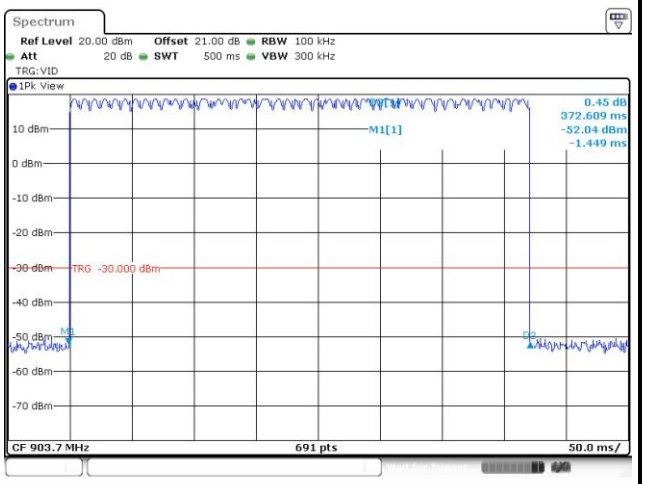
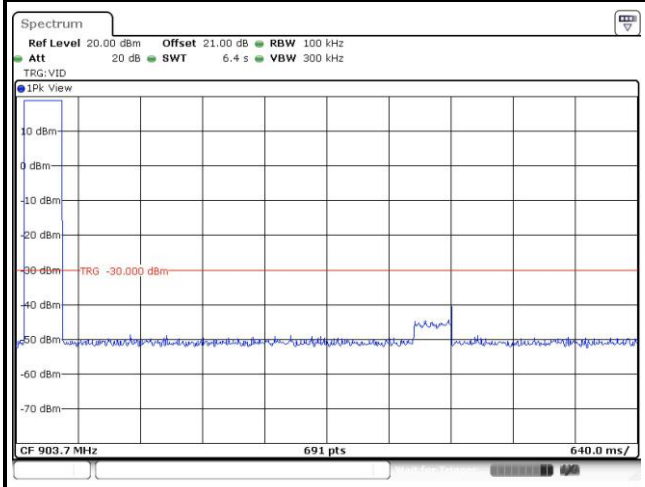
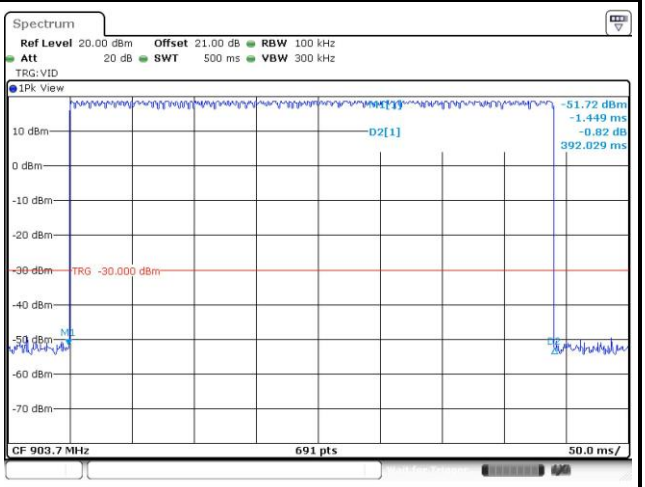


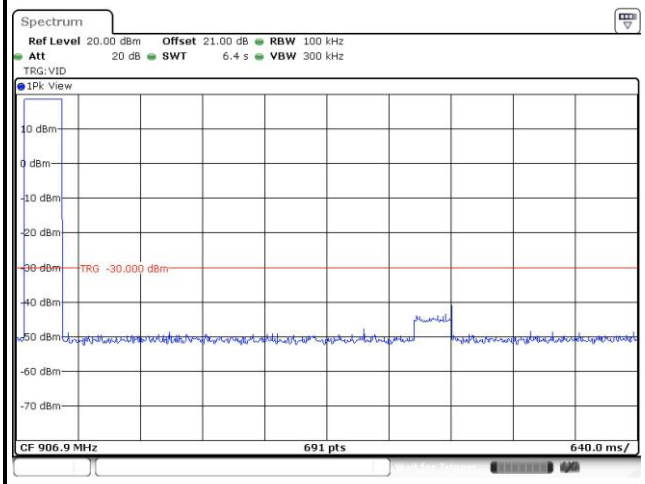
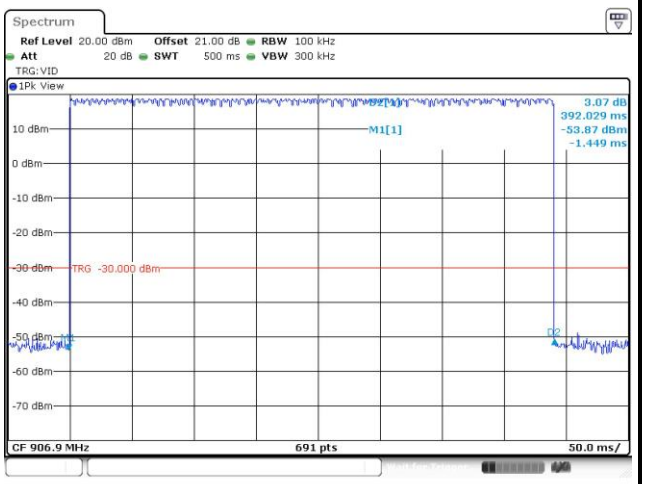
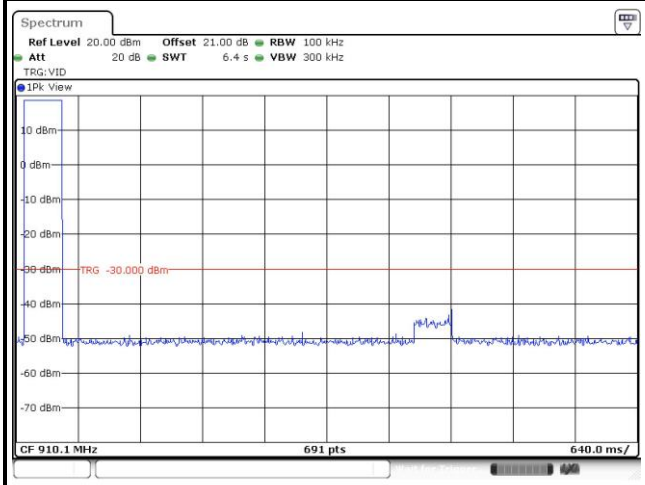
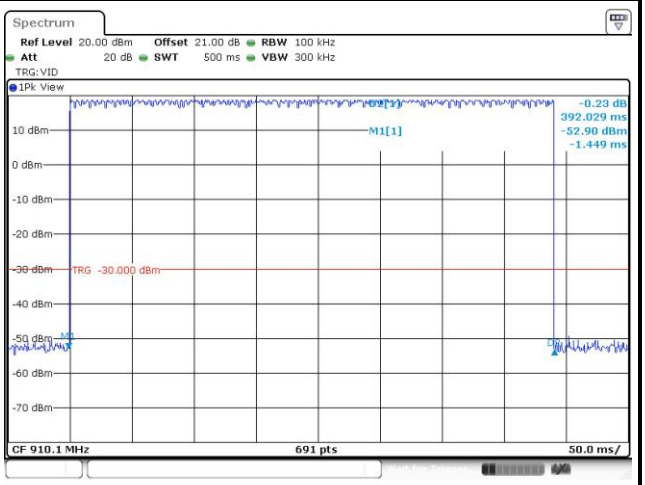
SF: 8

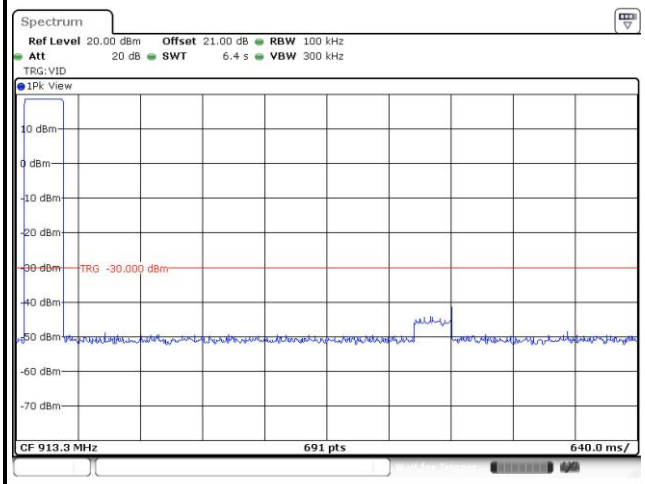
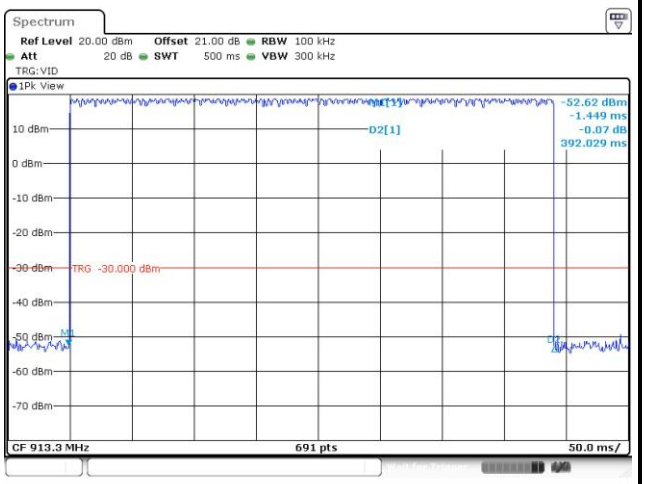
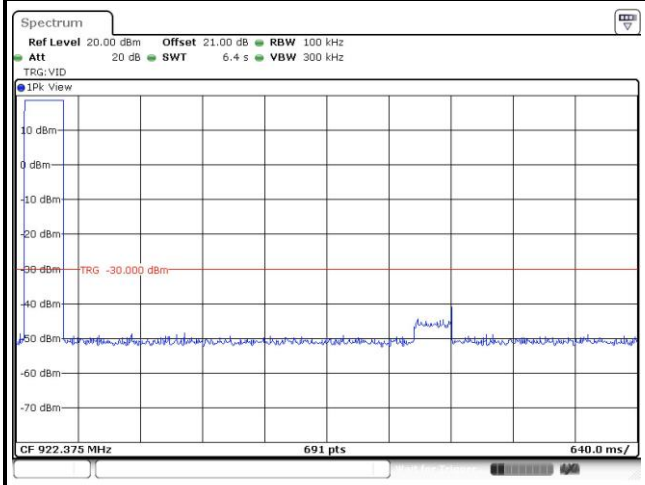
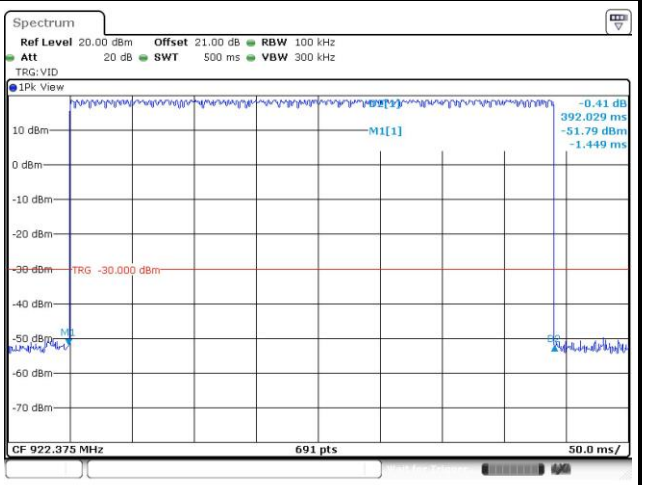


SF: 8



Frequency: 903.7 MHz	
SF: 9	**SF: 9**
	
SF: 10	**SF: 10**
	

Frequency: 906.9 MHz	
SF: 10	**SF: 10**
	
Frequency: 910.1 MHz	
SF: 10	**SF: 10**
	

Frequency: 913.3 MHz	
SF: 10	**SF: 10**
	
Frequency: 922.375 MHz	
SF: 10	**SF: 10**
	

3.9 Power Spectral Density

3.9.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.9.2 Test Procedures

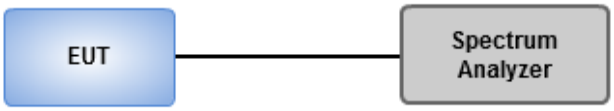
☒ Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.

1. Set the RBW = 3kHz, VBW = 10kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

☐ Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.

1. Set the RBW = 100kHz, VBW = 300 kHz.
2. Detector = RMS, Sweep time = auto couple.
3. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
4. Perform the measurement over a single sweep.
5. Use the peak marker function to determine the maximum amplitude level.

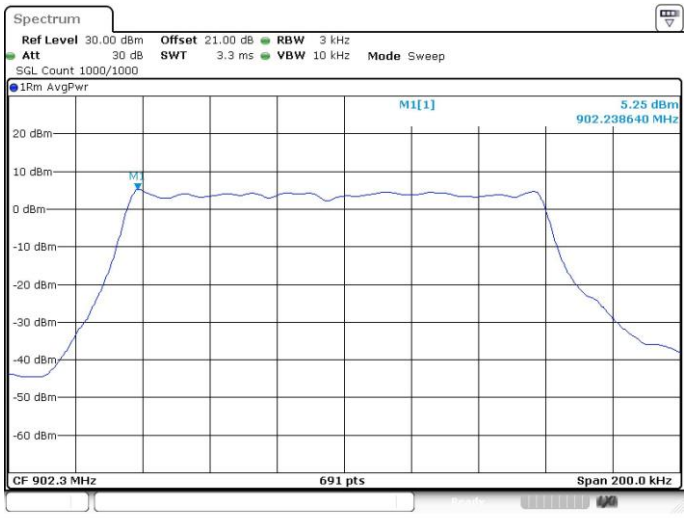
3.9.3 Test Setup



3.9.4 Test Result of Power Spectral Density

Modulation / SF	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
CSS / 10	902.3	5.25	8.00
CSS / 10	910.1	4.99	8.00
CSS / 10	924.375	4.95	8.00

Worst Plot



4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

==END==