Certificate # 2951.01

TEST REPORT

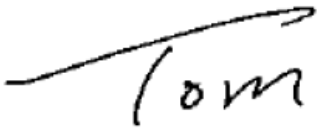
Applicant	Schneider Electric Industries SAS
Address	31 rue Pierre Mendes France, Eybens Grenoble cedex 9, 38050 France

Manufacturer or Supplier	Schneider Electric Industries SAS
Address	31 rue Pierre Mendes France, Eybens Grenoble cedex 9, 38050 France
Product	Energy Sensor
Brand Name	SQUARE D™
Model	PLTR20003P
Additional Model & Model Difference	PLTR1203P, PLTR6003P, PLTR10003P, see items 3.1
Date of tests	Nov. 29, 2019 ~ Mar. 27, 2020

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Tom Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	 Date: May 11, 2020

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF191129N012	Original release	May 11, 2020

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.76dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	4.96dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Energy Sensor
TEST MODEL	PLTR20003P
ADDITIONAL MODELS	PLTR1203P, PLTR6003P, PLTR10003P
FCC ID	2AH7L-PLTR
NOMINAL VOLTAGE	3N~100-277/ 173-480V, 50/60 Hz
MODULATION TECHNOLOGY	DSSS(IEEE 802.15.4)
MODULATION TYPE	OQPSK
OPERATING FREQUENCY	2405-2480MHz
PEAK OUTPUT POWER	10.45dBm(Maximum)
ANTENNA TYPE	PCB Antenna, with 2.5dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	Sensor cable: Shielded, non-detacahble, 2m

NOTES:

1. The EUT provides completed transmitters and receivers:

MODULATION MODE	FUNCTION
DSSS	1TX/1RX

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

4. Additional models (see about table) are identical with the test model PLTR20003P except the model name for trading purpose

3.2 DESCRIPTION OF TEST MODES

16 channels are provided

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
11	**2405 MHz**	19	2445 MHz
12	2410 MHz	20	2450 MHz
13	2415 MHz	21	2455 MHz
14	2420 MHz	22	2460 MHz
15	2425 MHz	23	2465 MHz
16	2430 MHz	24	2470 MHz
17	2435 MHz	25	2475 MHz
18	**2440 MHz**	**26**	**2480 MHz**

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.
The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	AC 120V 60Hz

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CONDITION
A	(2.4G) Link

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Kbps)
A	11 to 26	11	DSSS	OQPSK	250

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Kbps)
A	11 to 26	11,18, 26	DSSS	OQPSK	250

BANDEDGE MEASUREMENT:

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Kbps)
A	11 to 26	11,18, 26	DSSS	OQPSK	250

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Kbps)
A	11 to 26	11,18, 26	DSSS	OQPSK	250

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 53%RH	AC 120V 60Hz	Walker
RE≥1G	25deg. C, 53%RH	AC 120V 60Hz	Walker
PLC	20deg. C, 56%RH	AC 120V 60Hz	Ming Bai
APCM	25deg. C, 60%RH	AC 120V 60Hz	Sen

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C, Section 15.247
KDB558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

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

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	Lenovo	X240	PC02K1QM	N/A
2	Zigbee dongle	N/A	CC25XX USB	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC cable: Unshielded, detachable, 1.5m; DC cable: Unshielded, non-detachable, 1.8m
2	N/A

4 TEST TYPES AND RESULTS

4.1. CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTES: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCS30	100340	May 02,19	May 01,20
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100168	Oct. 22,19	Oct. 21,20
Artificial Mains Network	Rohde&Schwarz	ESH2-Z5	100071	Apr. 11,19	Apr. 10,20
Artificial Mains Network	SCHWARZBECK	NNLK 8129	8129-264	Feb. 04,20	Feb. 03,21
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 17,19	Jan. 16,20
Test software	ADT	ADT_Cond_ V7.3.7	N/A	N/A	N/A
Universal Radio Communication Tester	Rohde&Schwarz	CMU 200	119669	Mar. 12,20	Mar. 11,21
Radio Communication Analyzer	Annitsu	MT8820C	6201300716	Mar. 12,20	Mar. 11,21
Vector Signal Generator	Rohde&Schwarz	SMBV100A	1407.6004k02-259143-XW	Apr. 05,19	Apr. 04,20

NOTES: 1. The test was performed in shielded room 843.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

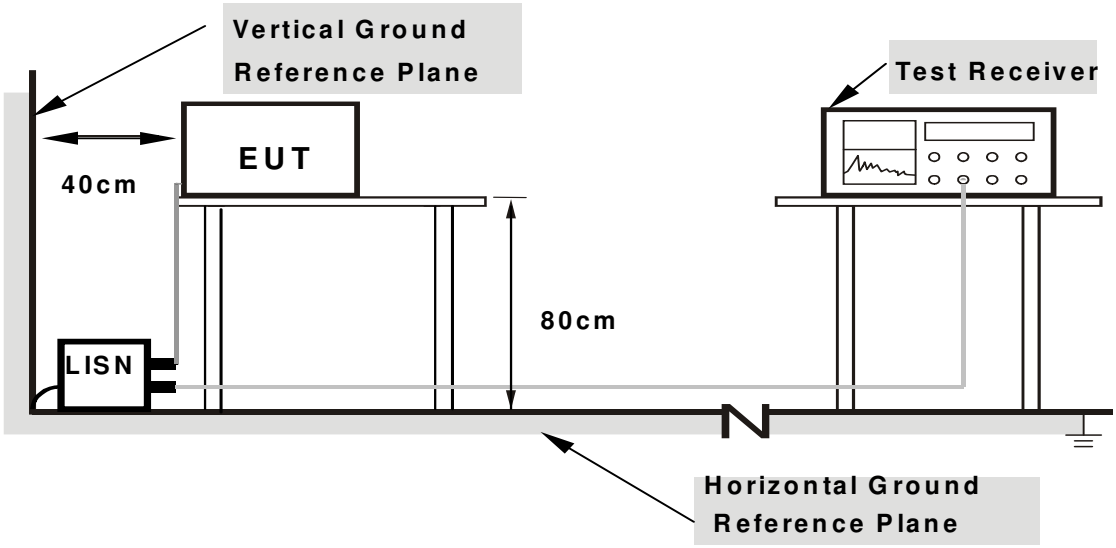
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

a. Turned on the power and connected of all equipment.
b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

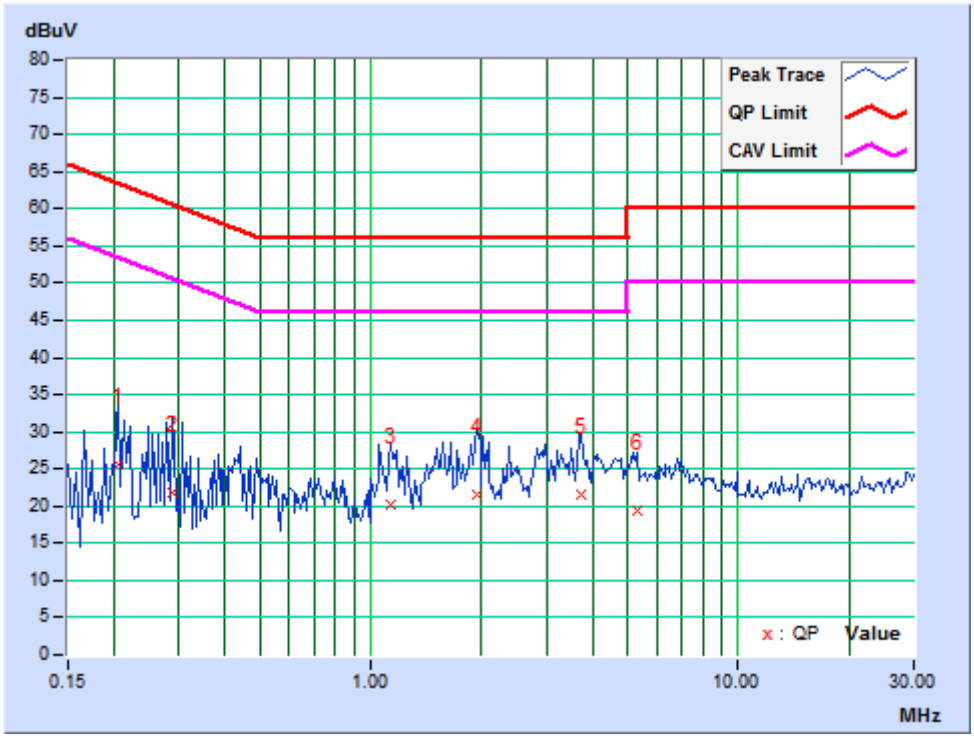
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA:

PHASE	Line	6dB BANDWIDTH	9kHz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20469	8.64	17.04	1.69	25.68	10.33	63.42	53.42	-37.74	-43.09
2	0.28672	8.95	12.81	2.68	21.76	11.63	60.62	50.62	-38.86	-38.99
3	1.13281	9.31	10.81	1.78	20.12	11.09	56.00	46.00	-35.88	-34.91
4	1.94141	9.32	12.21	2.75	21.53	12.07	56.00	46.00	-34.47	-33.93
5	3.73828	9.23	12.25	4.41	21.48	13.64	56.00	46.00	-34.52	-32.36
6	5.30078	9.19	10.09	1.29	19.28	10.48	60.00	50.00	-40.72	-39.52

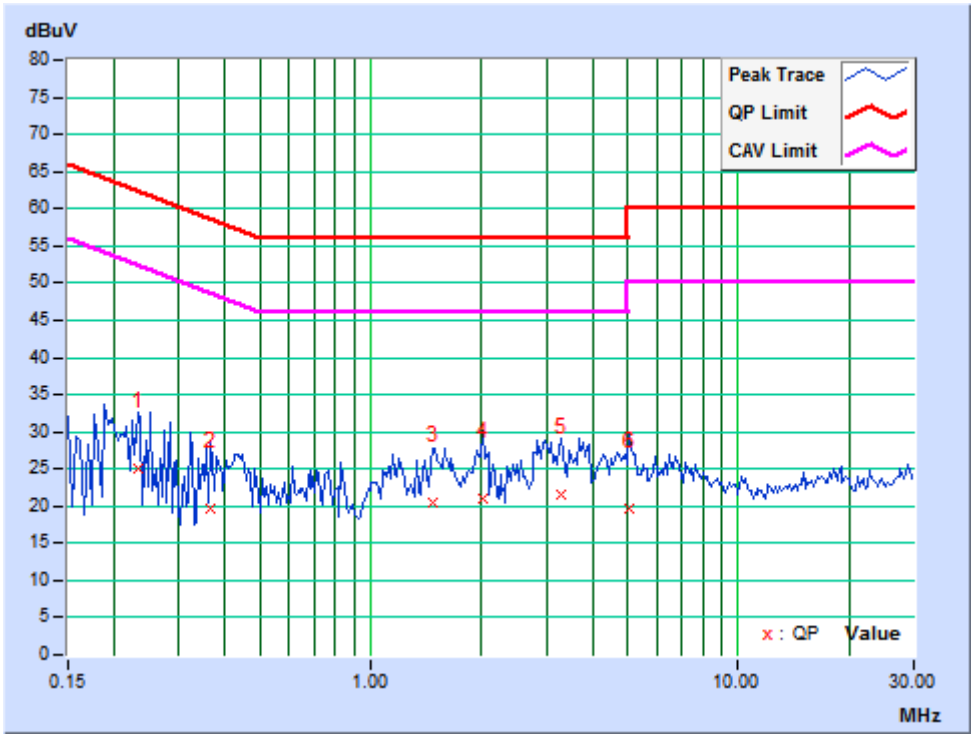
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



PHASE	Neutral	6dB BANDWIDTH	9kHz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23203	8.81	16.21	0.41	25.02	9.22	62.38	52.38	-37.36	-43.16
2	0.36484	9.12	10.52	1.60	19.64	10.72	58.62	48.62	-38.97	-37.89
3	1.47656	9.39	11.07	3.19	20.46	12.58	56.00	46.00	-35.54	-33.42
4	2.01563	9.40	11.61	1.81	21.01	11.21	56.00	46.00	-34.99	-34.79
5	**3.29688**	**9.35**	**12.33**	**5.42**	**21.68**	**14.77**	**56.00**	**46.00**	**-34.32**	**-31.23**
6	5.03516	9.28	10.28	3.66	19.56	12.94	60.00	50.00	-40.44	-37.06

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



4.2. RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTES:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 12,20	Mar. 11,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 22,19	May 21,20
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 28,19	May 27,20
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Apr. 21,19	Apr. 20,20
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	Jun. 23,19	Jun. 22,20
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Jun. 23,19	Jun. 22,20
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	May 05,19	May 04,20
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Apr. 21,19	Apr. 20,20
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	Apr. 21,19	Apr. 20,20
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 09,19	Nov. 08,20
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	May 20,19	May 19,20

NOTES:

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 749762.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c. For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

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

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.

g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTES:

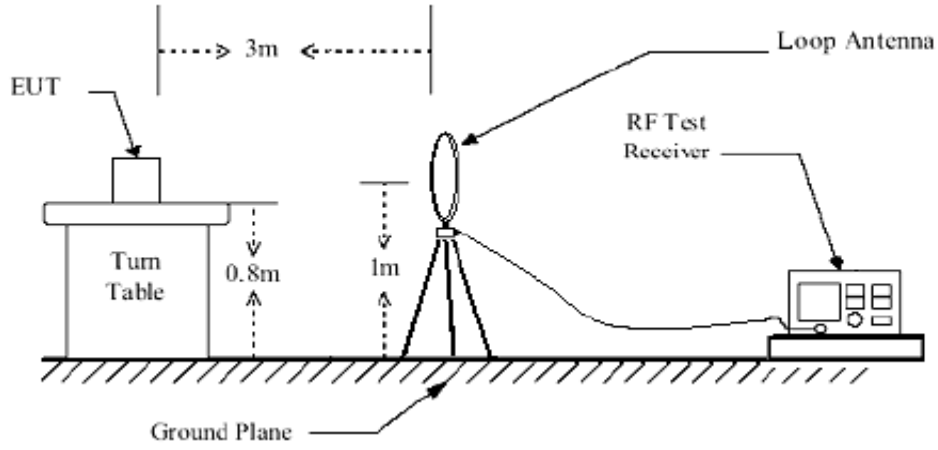
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes, the worst-case test configuration was reported on the file test setup photo.

4.2.4 DEVIATION FROM TEST STANDARD

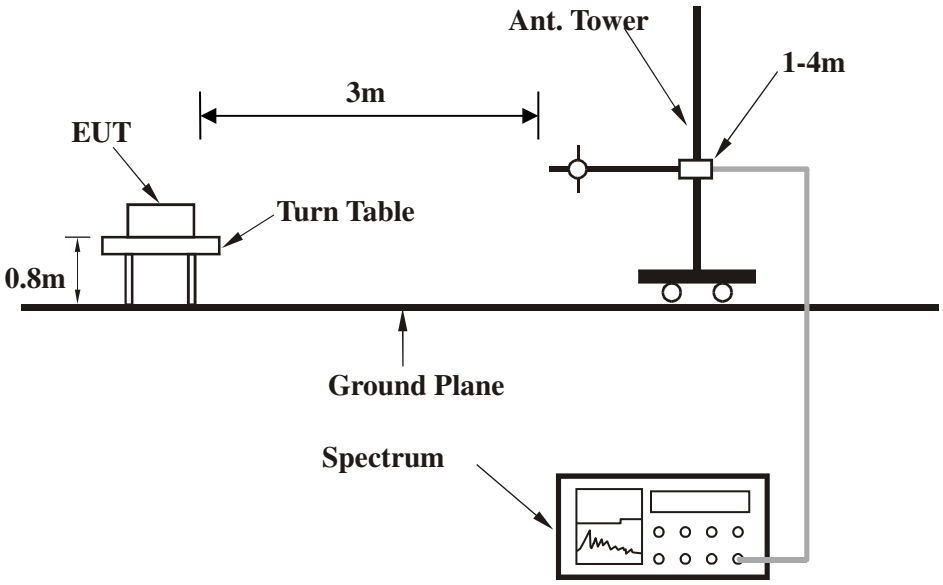
No deviation.

4.2.5 TEST SETUP

Below 30MHz test setup

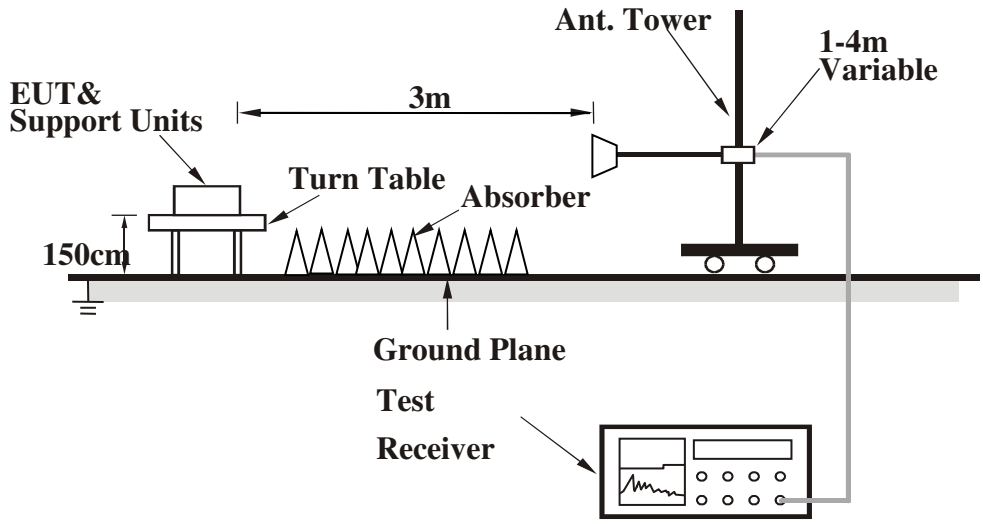


Below 1GHz test setup



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

Above 1GHz test setup



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

4.2.6 EUT OPERATING CONDITIONS

a. Placed the EUT on a testing table.
b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the EUT in full functions.

4.2.7 TEST RESULTS

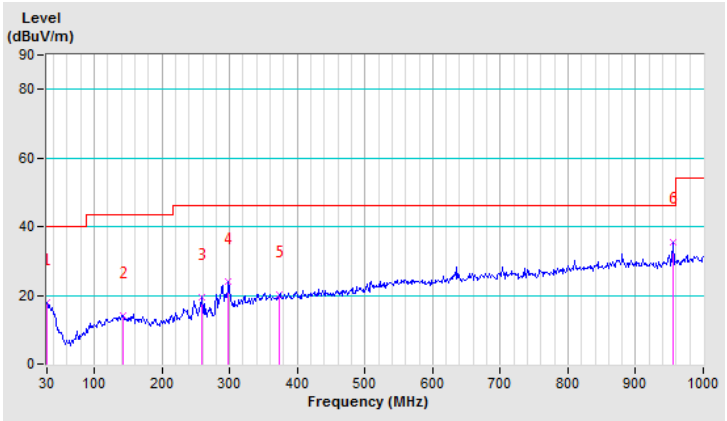
BELOW 1GHz WORST-CASE DATA:

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	17.86 QP	40.00	-22.14	2.00 H	238	29.06	-11.20
2	142.46	14.10 QP	43.50	-29.40	2.00 H	252	29.95	-15.85
3	259.14	19.26 QP	46.00	-26.74	2.00 H	268	34.68	-15.42
4	298.51	24.14 QP	46.00	-21.86	2.00 H	280	36.69	-12.55
5	373.01	20.28 QP	46.00	-25.72	2.00 H	293	30.38	-10.10
6	**955.01**	**35.62 QP**	**46.00**	**-10.38**	**2.00 H**	**317**	**35.58**	**0.04**

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.

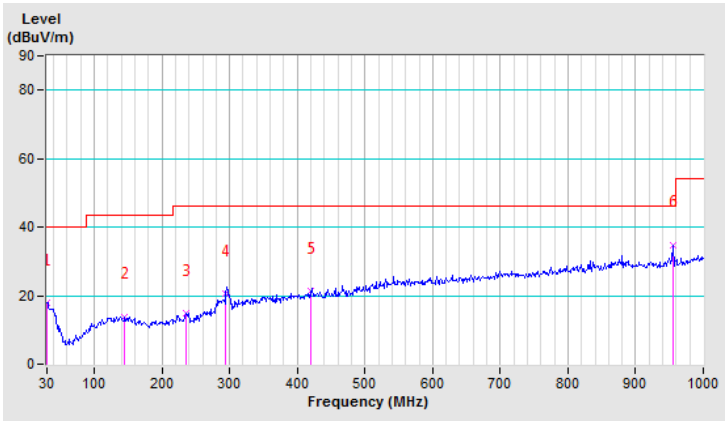


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	17.83 QP	40.00	-22.17	1.00 V	0	29.03	-11.20
2	145.28	13.92 QP	43.50	-29.58	1.00 V	0	29.91	-15.99
3	235.25	14.73 QP	46.00	-31.27	1.00 V	0	30.89	-16.16
4	294.29	20.69 QP	46.00	-25.31	1.00 V	0	33.47	-12.78
5	419.41	21.45 QP	46.00	-24.55	1.00 V	0	30.29	-8.84
6	955.01	34.89 QP	46.00	-11.11	1.00 V	0	34.85	0.04

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.



ABOVE 1GHz DATA

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	46.19 PK	74.00	-27.81	1.00 H	113	42.04	4.15
2	2390.00	33.91 AV	54.00	-20.09	1.00 H	113	29.76	4.15
3	*2405.00	103.73 PK			1.00 H	113	99.52	4.21
4	*2405.00	100.83 AV			1.00 H	113	96.62	4.21
5	4810.00	51.76 PK	74.00	-22.24	1.00 H	0	44.22	7.54
6	4810.00	37.17 AV	54.00	-16.83	1.00 H	0	29.63	7.54
7	#7215.00	55.37 PK	74.00	-18.63	1.00 H	0	43.00	12.37
8	#7215.00	40.35 AV	54.00	-13.65	1.00 H	0	27.98	12.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	45.03 PK	74.00	-28.97	1.00 V	122	40.88	4.15
2	2390.00	32.65 AV	54.00	-21.35	1.00 V	122	28.50	4.15
3	*2405.00	93.84 PK			1.00 V	122	89.63	4.21
4	*2405.00	90.83 AV			1.00 V	122	86.62	4.21
5	4810.00	51.62 PK	74.00	-22.38	1.00 V	0	44.08	7.54
6	4810.00	37.30 AV	54.00	-16.70	1.00 V	0	29.76	7.54
7	#7215.00	54.01 PK	74.00	-19.99	1.00 V	0	41.64	12.37
8	#7215.00	39.87 AV	54.00	-14.13	1.00 V	0	27.50	12.37

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 18	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	104.00 PK			1.00 H	125	99.64	4.36
2	*2440.00	100.95 AV			1.00 H	125	96.59	4.36
3	4880.00	52.34 PK	74.00	-21.66	1.00 H	0	44.66	7.68
4	4880.00	38.06 AV	54.00	-15.94	1.00 H	0	30.38	7.68
5	7320.00	55.47 PK	74.00	-18.53	1.00 H	0	42.98	12.49
6	7320.00	41.32 AV	54.00	-12.68	1.00 H	0	28.83	12.49
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
C	*2440.00	96.08 PK			1.00 V	108	91.72	4.36
2	*2440.00	92.75 AV			1.00 V	108	88.39	4.36
3	4880.00	52.34 PK	74.00	-21.66	1.00 V	0	44.66	7.68
4	4880.00	38.20 AV	54.00	-15.80	1.00 V	0	30.52	7.68
5	7320.00	55.13 PK	74.00	-18.87	1.00 V	0	42.64	12.49
6	7320.00	40.01 AV	54.00	-13.99	1.00 V	0	27.52	12.49

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 26	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	103.41 PK			1.00 H	116	98.89	4.52
2	*2480.00	100.59 AV			1.00 H	116	96.07	4.52
3	2483.50	60.97 PK	74.00	-13.03	1.00 H	116	56.43	4.54
4	**2483.50**	**46.95 AV**	**54.00**	**-7.05**	**1.00 H**	**116**	**42.41**	**4.54**
5	4960.00	53.32 PK	74.00	-20.68	1.00 H	0	45.48	7.84
6	4960.00	39.25 AV	54.00	-14.75	1.00 H	0	31.41	7.84
7	7440.00	56.48 PK	74.00	-17.52	1.00 H	0	43.86	12.62
8	7440.00	42.22 AV	54.00	-11.78	1.00 H	0	29.60	12.62
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	95.96 PK			1.00 V	345	91.44	4.52
2	*2480.00	93.06 AV			1.00 V	345	88.54	4.52
3	2483.50	61.70 PK	74.00	-12.30	1.00 V	345	57.16	4.54
4	2483.50	45.62 AV	54.00	-8.38	1.00 V	345	41.08	4.54
5	4960.00	52.26 PK	74.00	-21.74	1.00 V	0	44.42	7.84
6	4960.00	38.60 AV	54.00	-15.40	1.00 V	0	30.76	7.84
7	7440.00	55.18 PK	74.00	-18.82	1.00 V	0	42.56	12.62
8	7440.00	41.62 AV	54.00	-12.38	1.00 V	0	29.00	12.62

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. "* ": Fundamental frequency.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 22,19	May 21,20
Power Sensor	Keysight	U2021XA	MY55060018	May 22,19	May 21,20
Power Meter	Anritsu	ML2495A	1139001	Mar. 12,20	Mar. 11,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 12,20	Mar. 11,21
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 17, 19	Oct.16, 20
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Nov.15,19	Nov. 14,20
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 18,19	Sep. 17,20
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 13,20	Mar. 12,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 19,19	Sep. 18,20
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 12,19	Sep. 11,20
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	May 20,19	May 19,20
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

NOTES: 1. The test was performed in RF Oven room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

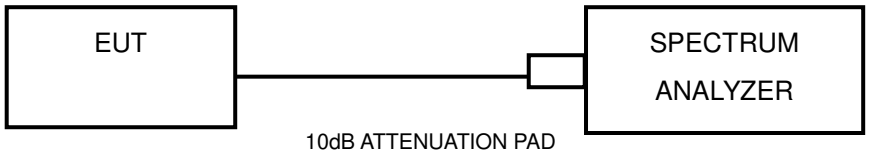
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



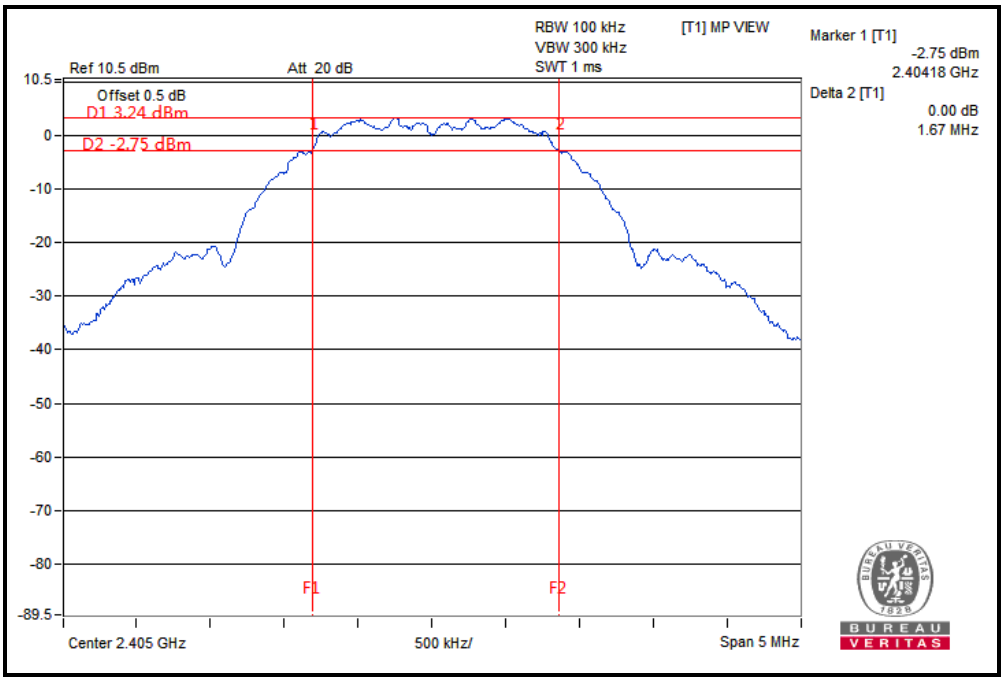
4.3.6 EUT OPERATING CONDITIONS

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

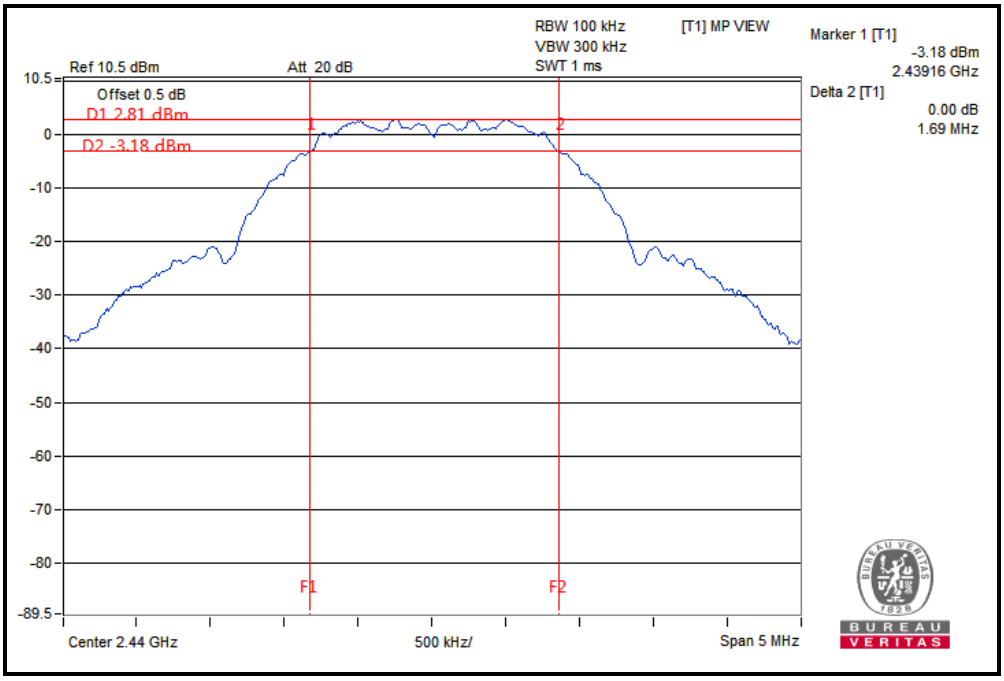
4.3.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
11	2405	1.67	0.5	PASS
18	2440	1.69	0.5	PASS
26	2480	1.67	0.5	PASS

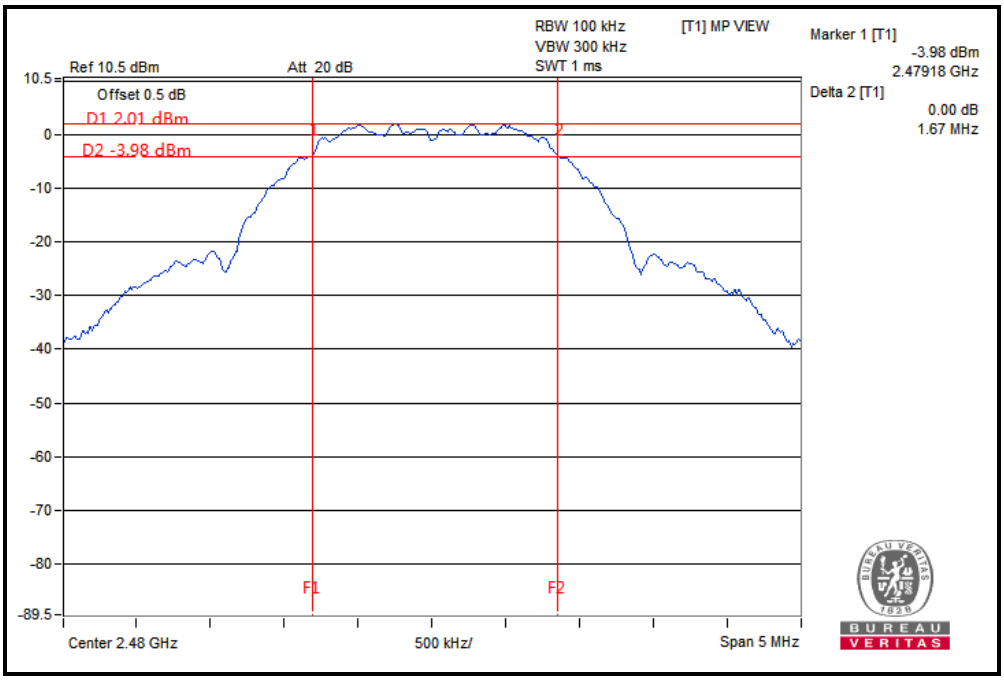
CH 11



CH 18


RBW 100 kHz
VBW 300 kHz
SWT 1 ms
[T1] MP VIEW
Marker 1 [T1]
-3.18 dBm
2.43916 GHz
Delta 2 [T1]
0.00 dB
1.69 MHz
Ref 10.5 dBm
Att 20 dB
Offset 0.5 dB
D1 2.81 dBm
D2 -3.18 dBm
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
F1
F2
Center 2.44 GHz
500 kHz/
Span 5 MHz

CH 26

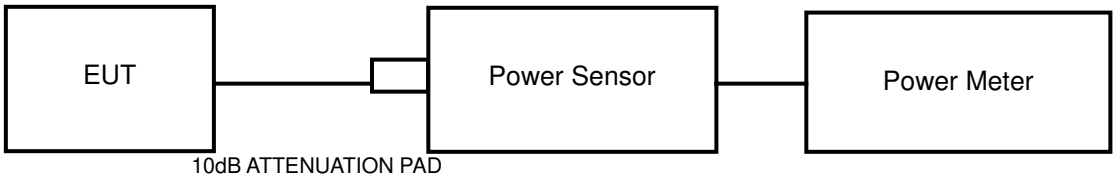

RBW 100 kHz
VBW 300 kHz
SWT 1 ms
[T1] MP VIEW
Marker 1 [T1]
-3.98 dBm
2.47918 GHz
Delta 2 [T1]
0.00 dB
1.67 MHz
Ref 10.5 dBm
Att 20 dB
Offset 0.5 dB
D1 2.01 dBm
D2 -3.98 dBm
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
F1
F2
Center 2.48 GHz
500 kHz/
Span 5 MHz

4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 22,19	May 21,20
Power Sensor	Keysight	U2021XA	MY55060018	May 22,19	May 21,20
Power Meter	Anritsu	ML2495A	1139001	Mar. 12,20	Mar. 11,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 12,20	Mar. 11,21
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 17, 19	Oct.16, 20
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Nov.15,19	Nov. 14,20
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 18,19	Sep. 17,20
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 13,20	Mar. 12,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 19,19	Sep. 18,20
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 12,19	Sep. 11,20
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	May 20,19	May 19,20
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

NOTES:

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A peak power meter was used to read the response of the peak power sensor. Record the peak power level.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

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

4.4.7 TEST RESULTS

MAXIMUM PEAK OUTPUT POWER

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
11	2405	10.45	11.092	1	PASS
18	2440	9.58	9.078	1	PASS
26	2480	8.92	7.798	1	PASS

AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

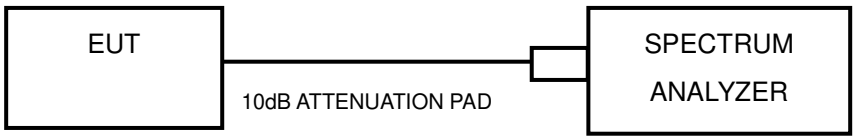
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
11	2405	7.29	5.358
18	2440	6.42	4.385
26	2480	5.84	3.837

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to 1.5 times the DTS Bandwidth.
c) Set RBW to: 3KHz
d) Set VBW ≥3 x RBW.
e) Detector = peak
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Use the peak marker function to determine the maximum amplitude level.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

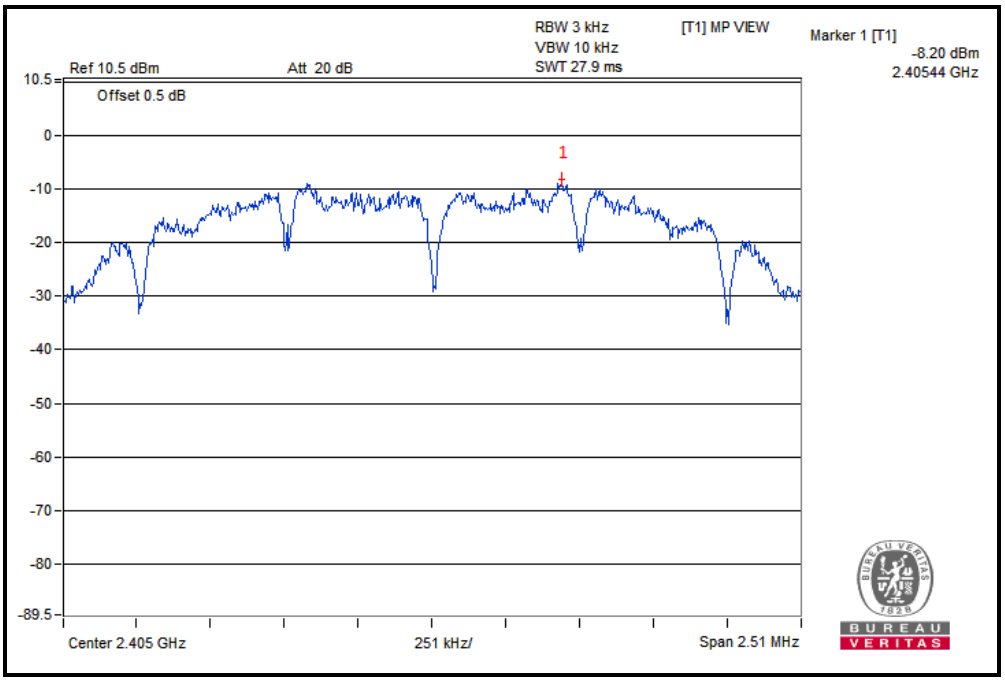
4.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.

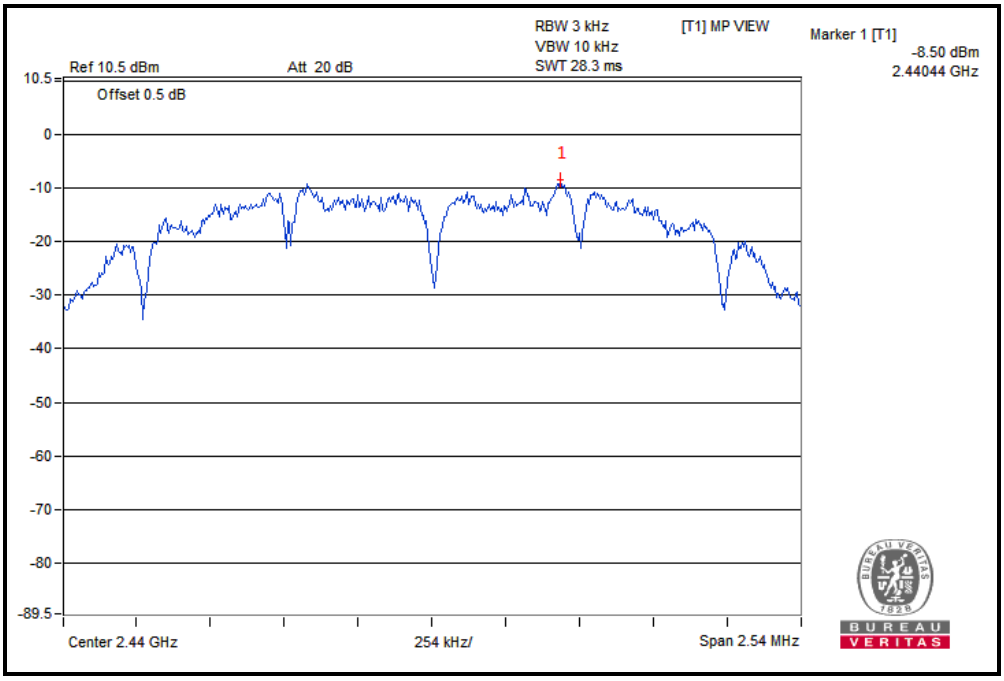
4.5.7 TEST RESULTS

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
11	2405	-8.20	8.00	PASS
18	2440	-8.50	8.00	PASS
26	2480	-9.32	8.00	PASS

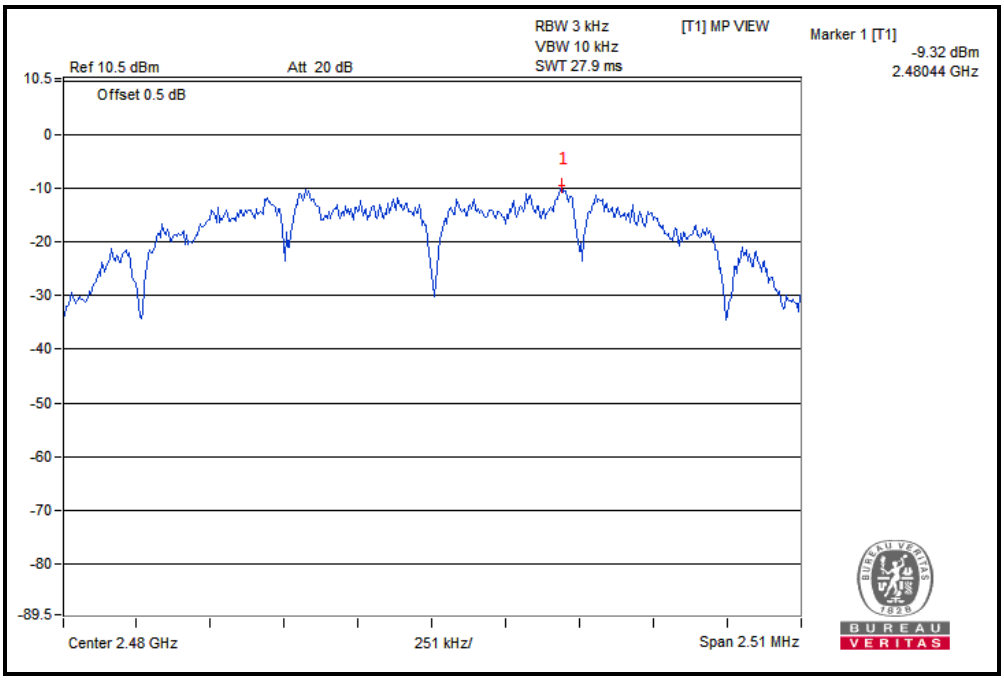
CH 11



CH 18


RBW 3 kHz
VBW 10 kHz
SWT 28.3 ms
[T1] MP VIEW
Marker 1 [T1]
-8.50 dBm
2.44044 GHz
Ref 10.5 dBm
Att 20 dB
Offset 0.5 dB
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.44 GHz
254 kHz/
Span 2.54 MHz

CH 26


RBW 3 kHz
VBW 10 kHz
SWT 27.9 ms
[T1] MP VIEW
Marker 1 [T1]
-9.32 dBm
2.48044 GHz
Ref 10.5 dBm
Att 20 dB
Offset 0.5 dB
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.48 GHz
251 kHz/
Span 2.51 MHz

4.6 OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST SETUP

4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.6.5 DEVIATION FROM TEST STANDARD

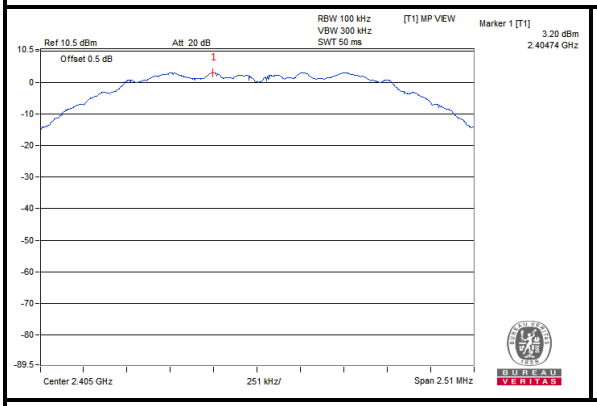
No deviation.

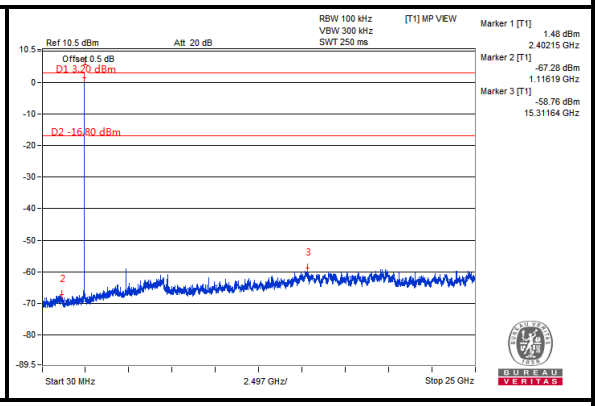
4.6.6 EUT OPERATING CONDITION

Same as item 4.3.6

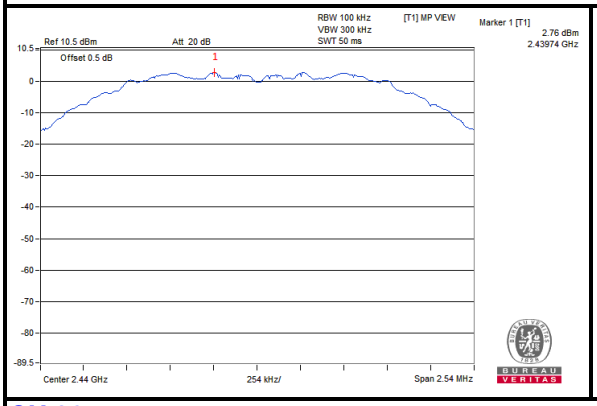
4.6.7 TEST RESULTS

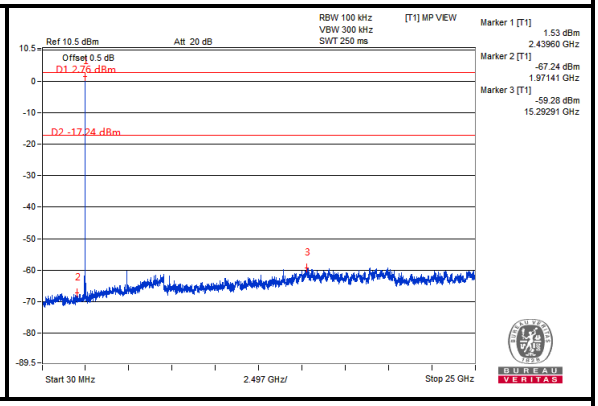
CH 11



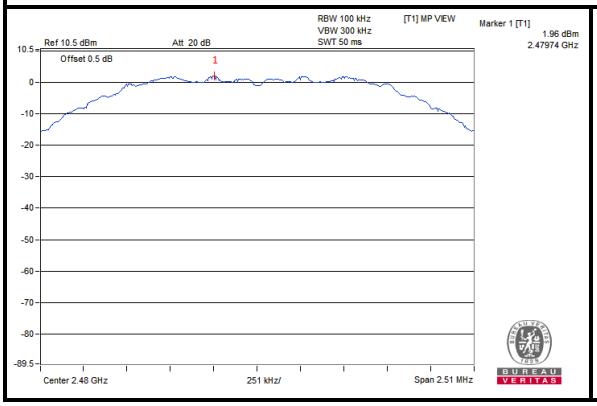


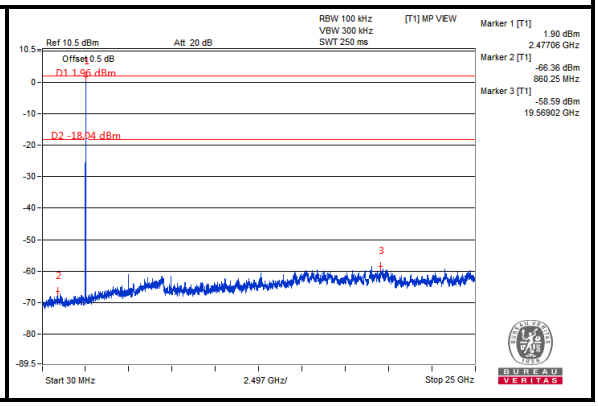
CH 18

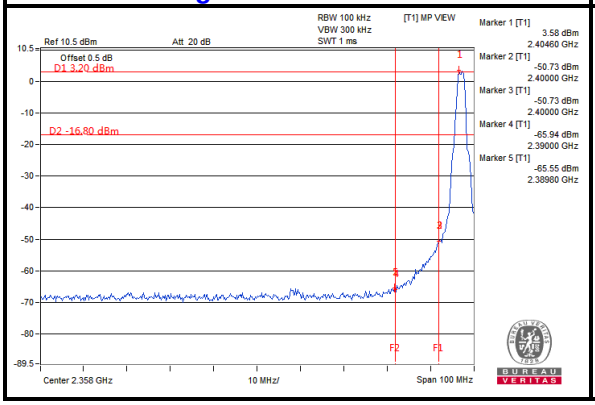
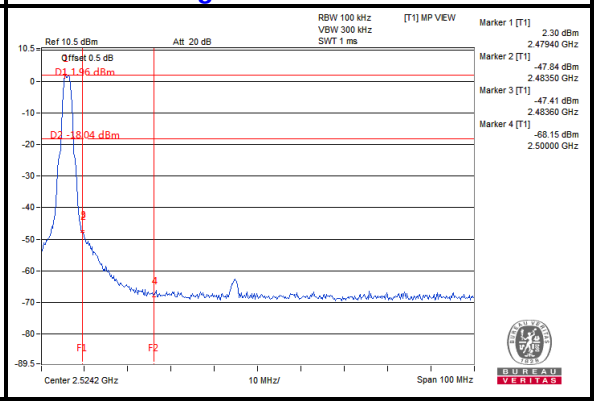




CH 26





CH 11 Band edge	CH 26 Band edge
	

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---