



Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

FCC CFR 47 PART 74

Report Reference No. : **GTS20200306005-1-6**

FCC ID. : **2AVV4-001**

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Date of issue : Mar. 27, 2020

Representative Laboratory Name : **Shenzhen Global Test Service Co.,Ltd.**

Address : No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Applicant's name : **Shenzhen Yilaisi Electronic Technology Co., Ltd.**

Address : 2nd Floor, 2 Building, forth industrial estate, Shanghenglang, Longhua district, Shenzhen, Guangdong, China

Test specification

Standard : FCC CFR 47 PART 74

TRF Originator : Shenzhen Global Test Service Co.,Ltd.

Master TRF : Dated 2014-12

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Test item description..... : **UHF Wireless Microphone System**

Trade Mark..... : N/A

Manufacturer..... : Shenzhen Yilaisi Electronic Technology Co., Ltd.

Model/Type reference..... : ALLAP-W1

Listed Models : UWM-2, WM1, WM2, WM3, UWM1, UWM2, UWM3, UWM4, UWM5, UWM6, UWM7, UWM8, UWM9, UWM1Pro, UWM2Pro, UWM3Pro, UWM4Pro, UWM5Pro, UWM6Pro

Modulation Type : FM

Operation Frequency : From 538.0-557.6MHz and 566.4-586.0MHz

Hardware Version : V1.5

Software Version : V1.3

Rating..... : DC 3.0V to 2*AA or DC 5.0V /0.2A to Adapter

Result..... : **PASS**

TEST REPORT

Test Report No. : GTS20200306005-1-6	Mar. 27, 2020
	Date of issue

Equipment under Test : UHF Wireless Microphone System

Model /Type : ALLAP-W1

Listed Models : UWM-2, WM1, WM2, WM3, UWM1, UWM2, UWM3, UWM4, UWM5, UWM6, UWM7, UWM8, UWM9, UWM1Pro, UWM2Pro, UWM3Pro, UWM4Pro, UWM5Pro, UWM6Pro

Applicant : **Shenzhen Yilaisi Electronic Technology Co., Ltd.**

Address : 2nd Floor, 2 Building, forth industrial estate, Shanghenglang, Longhua district, Shenzhen, Guangdong, China

Manufacturer : **Shenzhen Yilaisi Electronic Technology Co., Ltd.**

Address : 2nd Floor, 2 Building, forth industrial estate, Shanghenglang, Longhua district, Shenzhen, Guangdong, China

Test Result:	PASS
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 74](#): Experimental radio, auxiliary, special broadcast and other program distributional services.

[ANSI C63.4-2014](#): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

[KDB 935210 D05](#): KDB Publication 935210 D05 Measurements guidance for industrial and non-consumer signal booster, repeater, and amplifier devices

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Mar. 10, 2020
Testing commenced on	:	Mar. 10, 2020
Testing concluded on	:	Mar. 27, 2020

2.2. Product Description

Product Name	UHF Wireless Microphone System
Trade Mark	N/A
Model/Type reference	ALLAP-W1
List Models	UWM-2, WM1, WM2, WM3, UWM1, UWM2, UWM3, UWM4, UWM5, UWM6, UWM7, UWM8, UWM9, UWM1Pro, UWM2Pro, UWM3Pro, UWM4Pro, UWM5Pro, UWM6Pro
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Power supply:	DC 3.0V to 2*AA or DC 5.0V /0.2A to Adapter
UHF Wireless Microphone System(Transmitter)	
Frequency Range	538.0-557.6MHz and 566.4-586.0MHz
Channel No.	50 Channels form 538.0-557.6MHz 50 Channels form 566.4-586.0MHz
Modulation Type	FM
Rated Power	15mW/10mW
Antenna Description	External Antenna; 0dBi(Max.)

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 3.0V from battery

2.4. Short description of the Equipment under Test (EUT)

This is a UHF Wireless Microphone System.

For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

The EUT has been tested under typical operating condition.

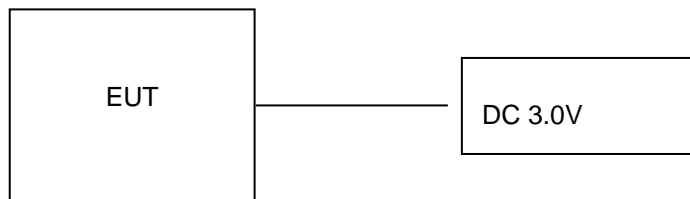
***Note: Only recorded the worst case in this report.

Channel List & Frequency:

Channel A			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	538.0	26	548.0
02	538.4	27	548.4
03	538.8	28	548.8
--	--	--	--
--	--	--	--
--	--	--	--
24	547.2	49	557.2
25	547.6	50	557.6

Channel B			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	566.4	26	576.4
02	566.8	27	576.8
03	567.2	28	577.2
--	--	--	--
--	--	--	--
--	--	--	--
24	575.6	49	585.6
25	576.0	50	586.0

2.6. Block Diagram of Test Setup



2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AVV4-001** filing to comply with Section 861 of the FCC Part 74.

2.8. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
SKF	Adapter	MR-0501000EU	--	SDOC

The adapter is provided by the laboratory.

2.9. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS (No. CNAS L8169)

Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)

Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

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

3.5. Summary of measurement results

Applied Standard: FCC Part 74		
FCC Rules	Description of Test	Result
FCC Part 74.861(e)(1)(ii) FCC Part 2.1046	Maximum Conducted Output Power	Compliant
FCC Part 74.861 (e)(5) FCC Part 2.1049	Occupied Bandwidth	Compliant
FCC Part 74.861 (e)(4) FCC Part 2.1055	Frequency error	Compliant
FCC Part 74.861(e)(6) FCC Part 2.1053	Transmitter unwanted emissions(radiated or conducted)	Compliant
FCC Part 2.1049 FCC Part 2.1047	Modulation characteristic	Compliant
FCC Part 74.861 (e)(7) FCC Part 2.1049	Necessary bandwidth (BN) for analogue systems	Compliant
§15.107(a) §15.207	Conducted Emission	Compliant

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed
3. We tested all test mode and recorded worst case in report

3.6. Equipments Used during the Test

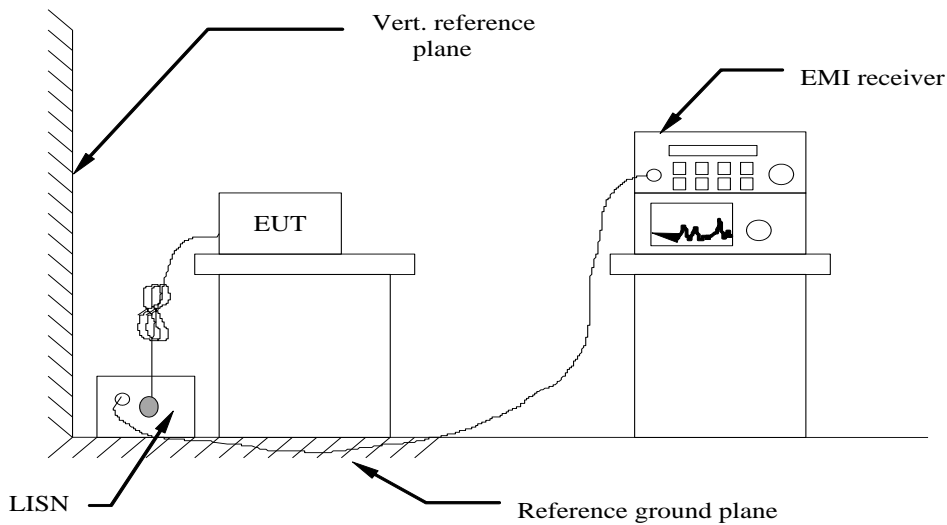
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2019/09/20	2020/09/19
LISN	R&S	ESH2-Z5	893606/008	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESPI3	101841-cd	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESCI7	101102	2019/09/20	2020/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2019/09/20	2020/09/19
Spectrum Analyzer	R&S	FSV40	100019	2019/09/20	2020/09/19
Vector Signal generator	Agilent	N5181A	MY49060502	2019/09/20	2020/09/19
Signal generator	Agilent	E4421B	3610AO1069	2019/09/20	2020/09/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2019/09/20	2020/09/19
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2019/09/23	2020/09/22
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2019/10/12	2020/10/11
Bilog Antenna	Schwarzbeck	VULB9163	000976	2019/05/26	2020/05/25
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV9179	9719-025	2019/09/20	2020/09/19
Amplifier	EMCI	EMC051845B	980355	2019/09/20	2020/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2019/09/20	2020/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2019/09/20	2020/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2019/09/20	2020/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2019/09/20	2020/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2019/09/20	2020/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2019/09/20	2020/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2019/09/20	2020/09/19
Test Control Unit	Tonscend	JS0806-1	178060067	2019/06/20	2020/06/19
Automated filter bank	Tonscend	JS0806-F	19F8060177	2019/06/20	2020/06/19
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2014.
- 2 Support equipment, if needed, was placed as per ANSI C63.4-2014.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2014.
- 4 The EUT received DC 5V power, the adapter received AC120V/60Hz or AC 240V/50Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

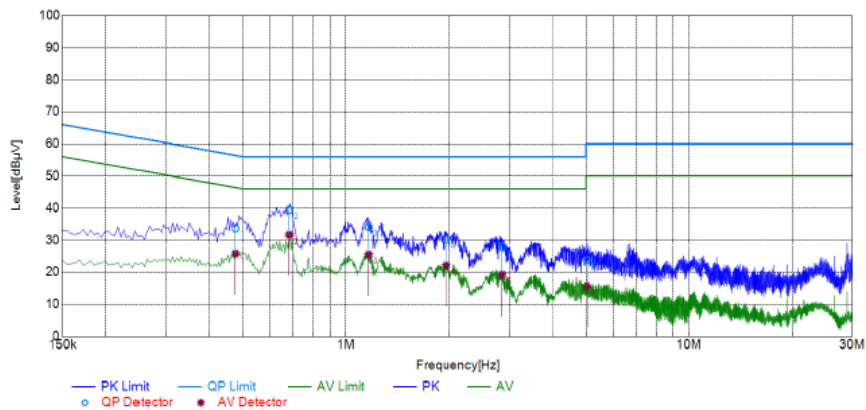
* Decreases with the logarithm of the frequency.

TEST RESULTS

Remark: We measured Conducted Emission at FM mode in AC 120V/60Hz and AC 240V/50Hz, the worst case was recorded .

Power supply:	AC 120V/60Hz	Polarization	L
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Test Graph



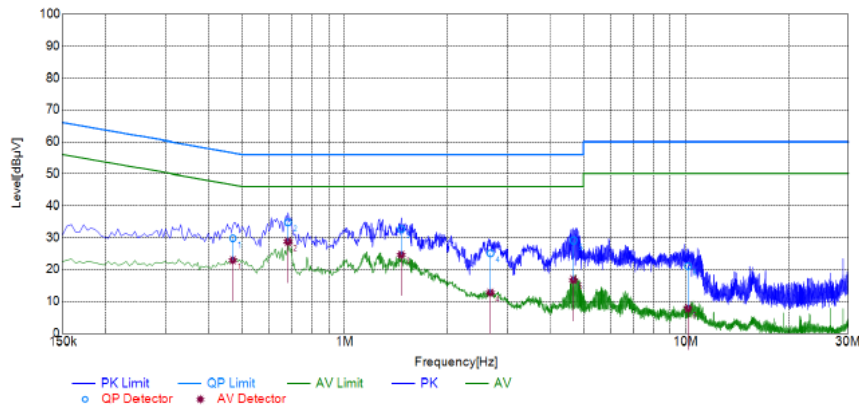
Final Data List

NO.	Frequency [MHz]	QP Reading [dBµV]	AVG Reading [dBµV]	Factor [dB]	QP Result [dBµV]	AVG Result [dBµV]	QP Limit [dBµV]	AVG Limit [dBµV]	QP Margin [dB]	AVG Margin [dB]	Line	Remark
1	0.4758	23.40	15.62	10.24	33.64	25.86	56.41	46.41	22.77	20.55	L1	PASS
2	0.6822	29.19	21.43	10.22	39.41	31.65	56.00	46.00	16.59	14.35	L1	PASS
3	1.1615	23.90	15.38	10.21	34.11	25.59	56.00	46.00	21.89	20.41	L1	PASS
4	1.9558	19.94	11.88	10.27	30.21	22.15	56.00	46.00	25.79	23.85	L1	PASS
5	2.8472	17.61	8.87	10.33	27.94	19.20	56.00	46.00	28.06	26.80	L1	PASS
6	5.0425	13.52	5.34	10.34	23.86	15.68	60.00	50.00	36.14	34.32	L1	PASS

Note: 1. Result (dBµV) = Reading (dBµV) + Factor (dB).
 2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

Power supply:	AC 120V/60Hz	Polarization	N
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Test Graph



Final Data List

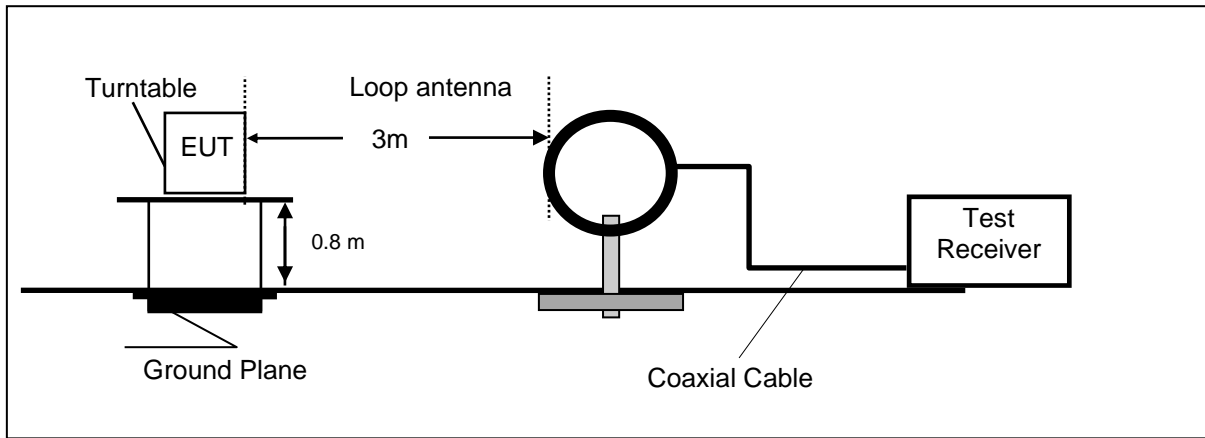
NO.	Frequency [MHz]	QP Reading [dBµV]	AVG Reading [dBµV]	Factor [dB]	QP Result [dBµV]	AVG Result [dBµV]	QP Limit [dBµV]	AVG Limit [dBµV]	QP Margin [dB]	AVG Margin [dB]	Line	Remark
1	0.4691	19.46	12.70	10.24	29.70	22.94	56.53	46.53	26.83	23.59	N	PASS
2	0.6806	24.57	18.52	10.22	34.79	28.74	56.00	46.00	21.21	17.26	N	PASS
3	1.4609	22.41	14.45	10.23	32.64	24.68	56.00	46.00	23.36	21.32	N	PASS
4	2.6748	14.81	2.44	10.31	25.12	12.75	56.00	46.00	30.88	33.25	N	PASS
5	4.6808	18.74	6.49	10.35	29.09	16.84	56.00	46.00	26.91	29.16	N	PASS
6	10.1354	10.43	-2.74	10.60	21.03	7.86	60.00	50.00	38.97	42.14	N	PASS

Note: 1. Result (dBµV) = Reading (dBµV) + Factor (dB).
 2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

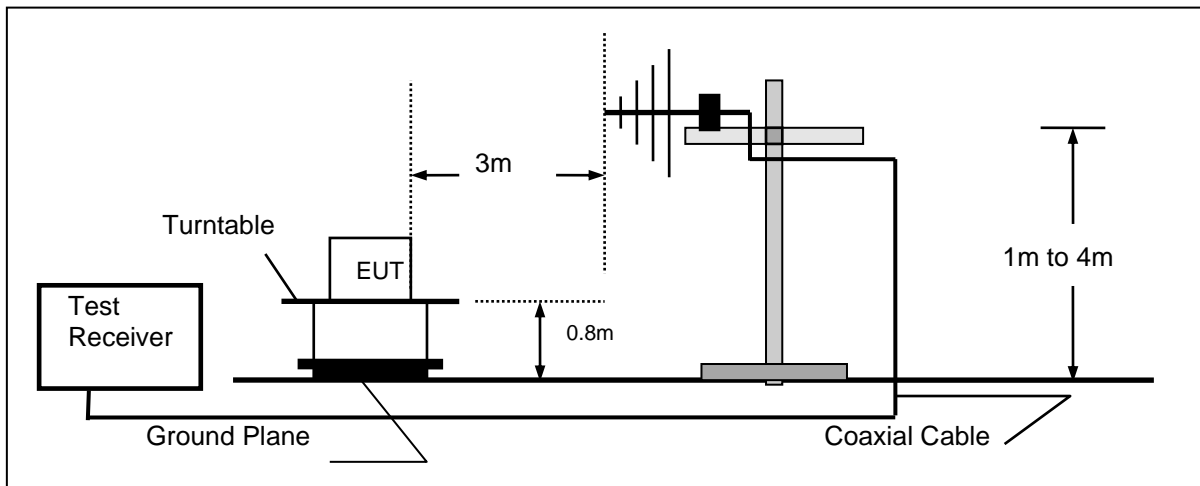
4.2. Transmitter unwanted emissions(radiated or conducted)

TEST CONFIGURATION

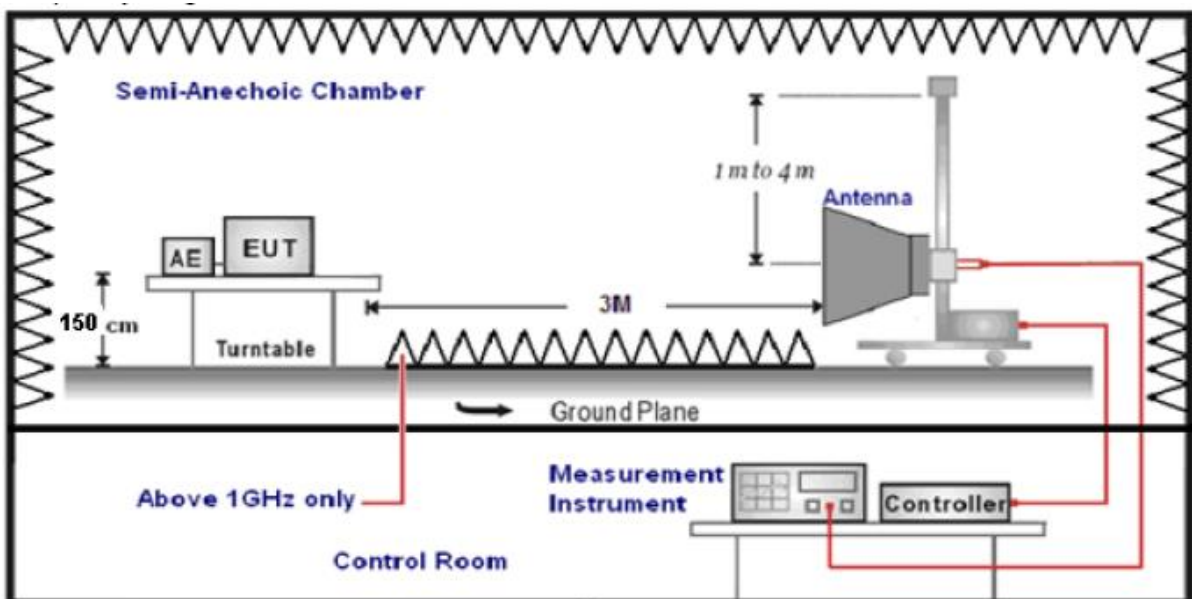
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
The measurement results are obtained as described below:
 $Power(EIRP) = P_{Mea} - P_{cl} + G_a$
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
8. In order to make sure test results more clearly, we set frequency range and sweep time for difference frequency range as follows table:

RADIATION LIMIT

FCC & IC (according to ETSI EN 300 422-1 V2.1.2 (2017-01))			
State	Max. spurious level		
	47 MHz to 74 MHz 87.5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1000 MHz	All frequencies > 1000 MHz
Operating	4.0 nW	250 nW	1.00 μW
Standby	2.0 nW	2.0 nW	20.0 nW

FCC & IC	
The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:	
On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least	25 dB
On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth	35 dB
On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least	43 + 10log10 (mean output power in watts) dB

TEST RESULTS

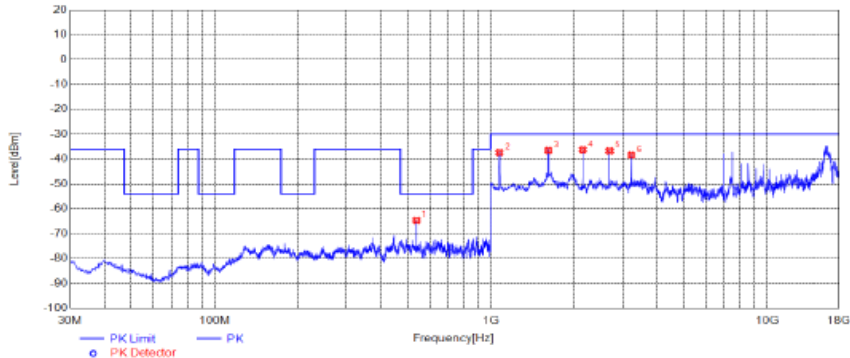
Remark: We measured Radiated Emission at FM mode from 30MHz to 25GHz and recorded worst case at High power mode.

Radiated Emissions:

For 30MHz-18GHz

Channel 0 / 538.0 MHz
Horizontal

Test Graph



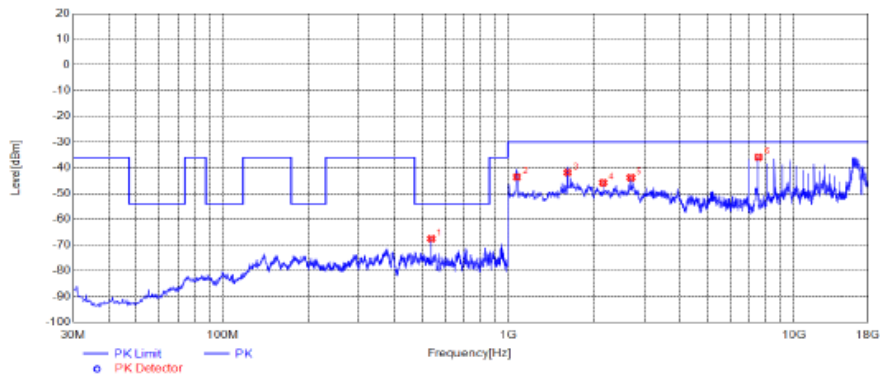
Suspected List								
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	537.9936	-100.48	10.62	150	170	PK	Horizontal	PASS
2	10748.150	-100.55	7.40	150	170	PK	Horizontal	PASS
3	1615.5231	-95.26	6.49	150	32	PK	Horizontal	PASS
4	2152.8306	-98.69	6.23	150	163	PK	Horizontal	PASS
5	2690.1380	-97.71	6.67	150	301	PK	Horizontal	PASS
6	3227.4455	-94.80	8.37	150	107	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



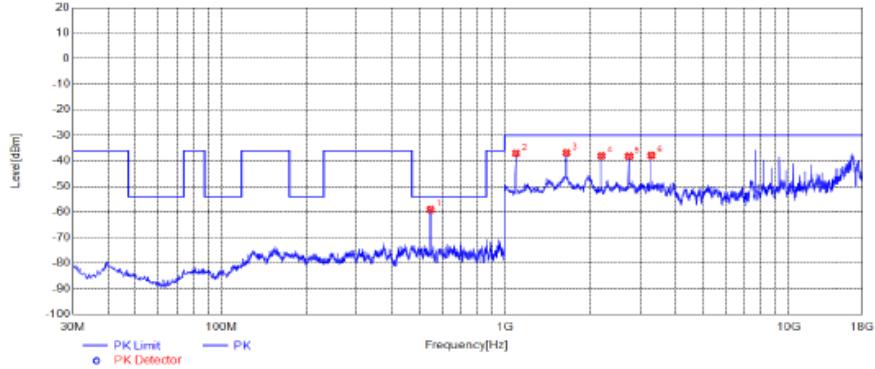
Suspected List								
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	537.9936	-100.89	13.54	150	21	PK	Vertical	PASS
2	10748.150	-100.05	13.58	150	2	PK	Vertical	PASS
3	1615.5231	-97.85	11.84	150	2	PK	Vertical	PASS
4	2152.8306	-97.37	15.77	150	25	PK	Vertical	PASS
5	2690.1380	-94.61	13.85	150	21	PK	Vertical	PASS
6	7532.7065	-89.54	5.83	150	271	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Channel 0 / 547.6 MHz
Horizontal

Test Graph



Suspected List

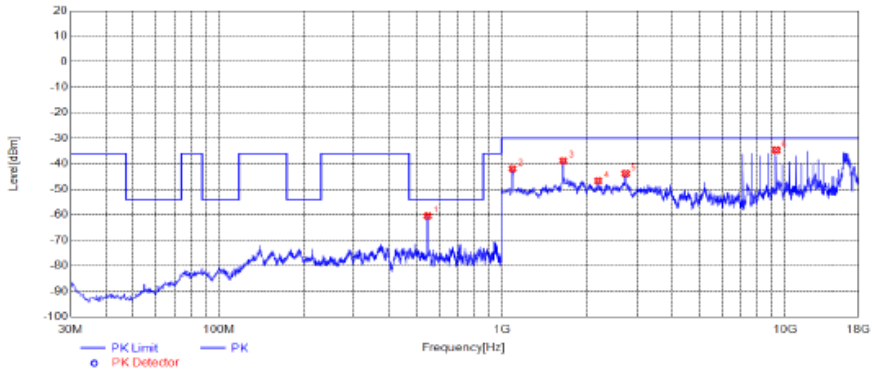
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	547.5015	-99.46	5.01	150	187	PK	Horizontal	PASS
2	1095.2190	-100.12	7.00	150	199	PK	Horizontal	PASS
3	1649.5299	-94.84	6.83	150	302	PK	Horizontal	PASS
4	2190.2380	-98.63	8.05	150	152	PK	Horizontal	PASS
5	2737.7476	-95.62	8.18	150	306	PK	Horizontal	PASS
6	3285.2571	-94.32	7.87	150	96	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

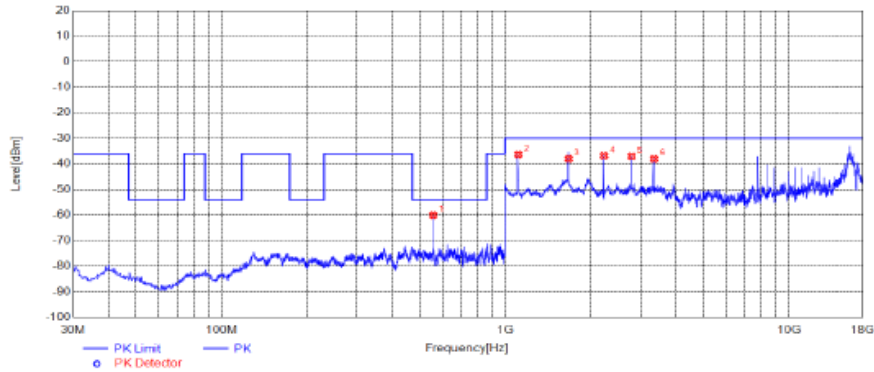
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	547.6955	-99.39	6.48	150	202	PK	Vertical	PASS
2	1091.8184	-99.96	11.94	150	132	PK	Vertical	PASS
3	1649.5299	-95.84	8.83	150	191	PK	Vertical	PASS
4	2190.2380	-96.73	16.68	150	350	PK	Vertical	PASS
5	2737.7476	-93.67	13.82	150	33	PK	Vertical	PASS
6	9307.8616	-90.62	4.68	150	211	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Channel 0 / 557.6 MHz
Horizontal

Test Graph



Suspected List

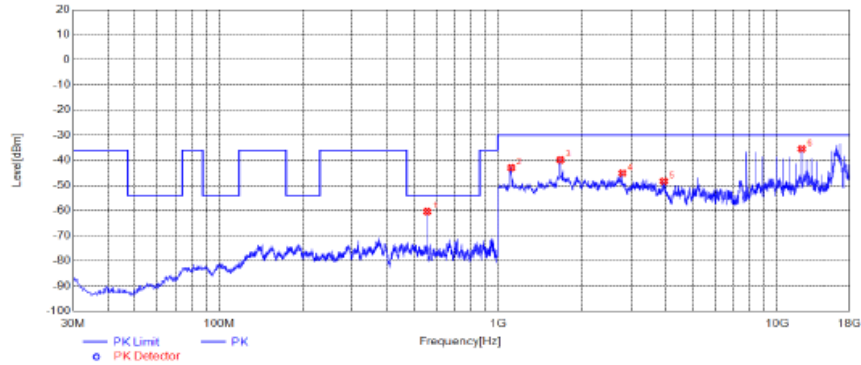
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	557.5915	-99.31	6.08	150	206	PK	Horizontal	PASS
2	1112.2224	-100.22	6.32	150	33	PK	Horizontal	PASS
3	1673.3347	-96.00	7.98	150	2	PK	Horizontal	PASS
4	2231.0462	-99.11	6.78	150	166	PK	Horizontal	PASS
5	2788.7578	-95.48	7.02	150	281	PK	Horizontal	PASS
6	3346.4693	-94.17	8.03	150	80	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

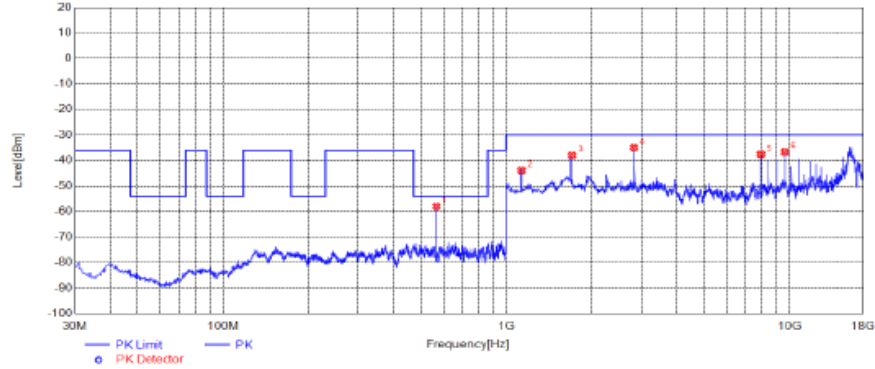
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	557.5915	-98.48	6.40	150	162	PK	Vertical	PASS
2	1115.6231	-99.74	12.91	150	2	PK	Vertical	PASS
3	1673.3347	-95.75	9.80	150	2	PK	Vertical	PASS
4	2792.1584	-95.29	15.08	150	215	PK	Vertical	PASS
5	3934.7870	-92.21	18.32	150	85	PK	Vertical	PASS
6	12266.4533	-91.10	5.43	150	223	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Channel 0 / 566.4 MHz
Horizontal

Test Graph



Suspected List

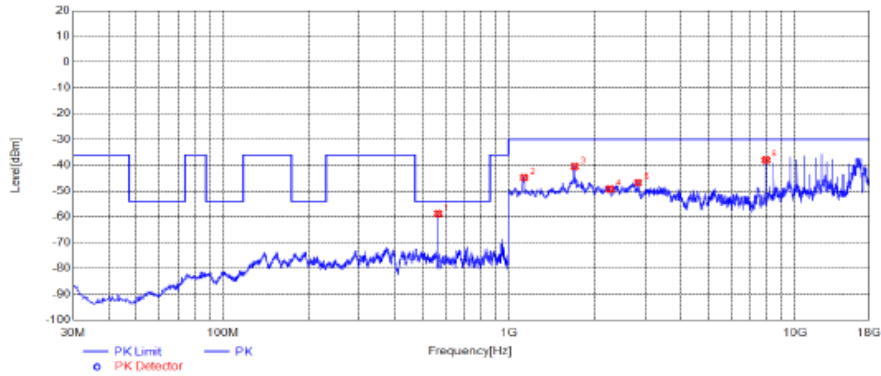
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	566.5173	-101.16	3.97	150	194	PK	Horizontal	PASS
2	1132.6265	-100.56	13.90	150	203	PK	Horizontal	PASS
3	1707.3415	-97.51	7.98	150	294	PK	Horizontal	PASS
4	2826.1652	-95.60	4.95	150	310	PK	Horizontal	PASS
5	7930.5861	-93.44	7.58	150	282	PK	Horizontal	PASS
6	9627.5255	-91.14	6.65	150	298	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

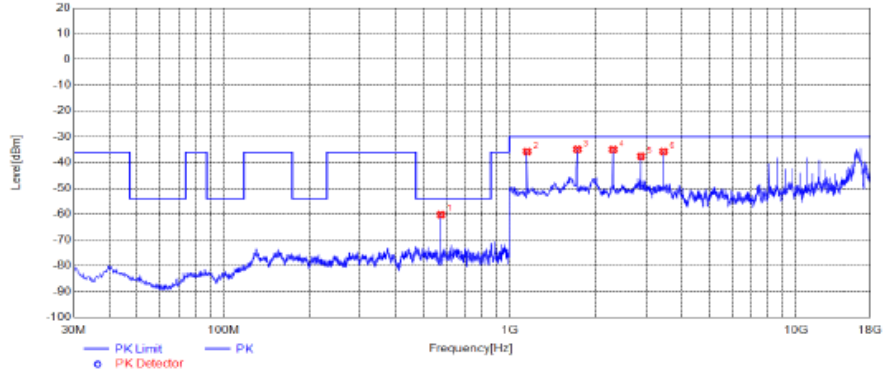
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	566.3233	-102.40	4.71	150	159	PK	Vertical	PASS
2	1132.6265	-99.54	14.77	150	2	PK	Vertical	PASS
3	1700.5401	-95.67	10.47	150	2	PK	Vertical	PASS
4	2265.0530	-97.02	19.16	150	140	PK	Vertical	PASS
5	2832.9666	-95.57	16.72	150	2	PK	Vertical	PASS
6	7930.5861	-93.97	7.98	150	195	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Channel 0 / 576.0 MHz
Horizontal

Test Graph



Suspected List

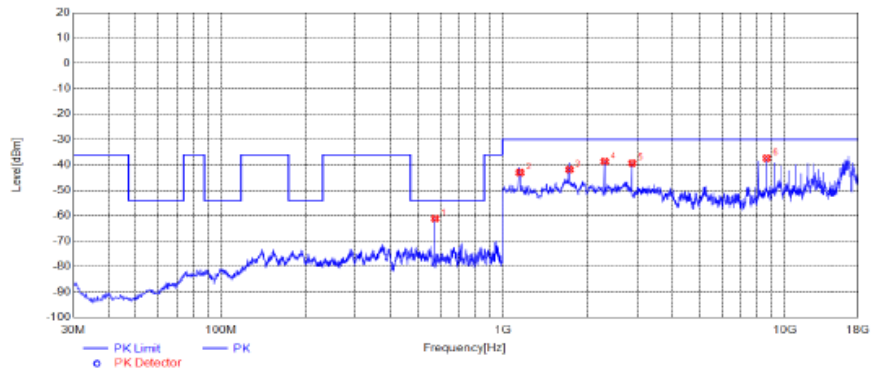
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	576.0252	-100.66	6.21	150	75	PK	Horizontal	PASS
2	1153.0306	-100.69	5.69	150	40	PK	Horizontal	PASS
3	1727.7455	-98.01	4.99	150	32	PK	Horizontal	PASS
4	2302.4605	-95.83	4.98	150	60	PK	Horizontal	PASS
5	2880.5761	-96.49	7.57	150	40	PK	Horizontal	PASS
6	3455.2911	-94.12	5.69	150	88	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

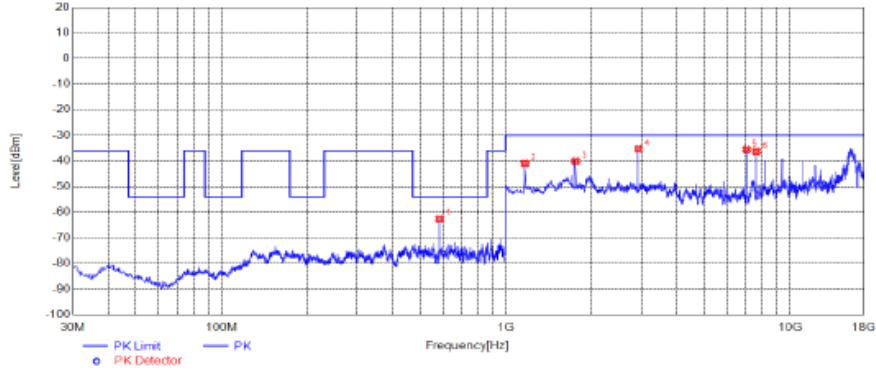
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	576.0252	-99.05	7.10	150	45	PK	Vertical	PASS
2	1153.0306	-99.32	12.98	150	2	PK	Vertical	PASS
3	1727.7455	-95.66	11.80	150	2	PK	Vertical	PASS
4	2302.4605	-98.41	8.60	150	155	PK	Vertical	PASS
5	2880.5761	-96.61	9.25	150	2	PK	Vertical	PASS
6	8641.3283	-91.85	7.36	150	214	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Channel 0 / 586.0 MHz
Horizontal

Test Graph



Suspected List

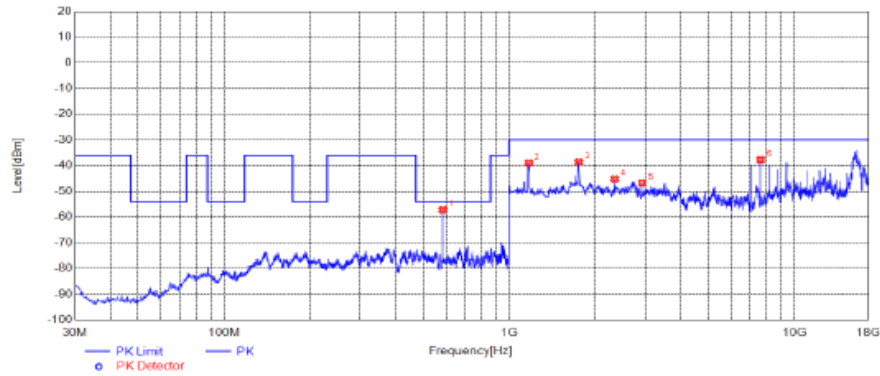
NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	585.9212	-99.28	8.61	150	245	PK	Horizontal	PASS
2	1170.0340	-99.78	10.98	150	231	PK	Horizontal	PASS
3	1761.7524	-98.36	10.07	150	160	PK	Horizontal	PASS
4	2931.5863	-96.96	5.27	150	56	PK	Horizontal	PASS
5	7032.8066	-93.88	5.52	150	337	PK	Horizontal	PASS
6	7617.7235	-94.20	6.25	150	298	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Factor [dB]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	585.9212	-100.71	3.21	150	358	PK	Vertical	PASS
2	1173.4347	-99.24	8.95	150	2	PK	Vertical	PASS
3	1754.9510	-95.64	8.57	150	255	PK	Vertical	PASS
4	2343.2687	-96.06	15.19	150	203	PK	Vertical	PASS
5	2924.7850	-97.10	16.76	150	17	PK	Vertical	PASS
6	7617.7235	-94.89	7.72	150	168	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

4.3. Maximum Peak Output Power

Measurement description

Two traces are captured to show the difference between input- and output signals and to measure the effective output power of the device. Trace 1 shows the measurement results of the output signal and trace 2 shows the measurement results of the input signal. Marker D2 in the plots shows the difference between the input and the output signal

Measurement

Measurement parameter	
Detector:	Peak (worst case) / Average (RMS)
Sweep time:	Auto / 20s
Resolution bandwidth:	> emission bandwidth
Video bandwidth:	> resolution bandwidth
Span:	> 2 times emissions bandwidth
Trace mode:	Max. hold
EUT configuration:	Peak: Unmodulated carrier RMS: Modulate the transmitter with a 2.5 kHz tone at a level 16 dB higher than that required to produce a frequency deviation of ± 75 kHz, or to produce 50% of the manufacturer's rated deviation, whichever is less.

Limits

FCC&IC	
470 MHz to 608 MHz	250 mW (average) / 24 dBm (average)

Test result

The EUT was programmed to be in continuously transmitting mode.

High Power						
Test Mode	Channel	Frequency (MHz)	Measured Maximum Peak Power(dBm)	Measured Maximum Average Power(dBm)	Limits Average (dBm)	Verdict
FM	01	538.0	11.241	/	24	PASS
	25	547.6	11.268	/		
	50	557.6	11.072	/		

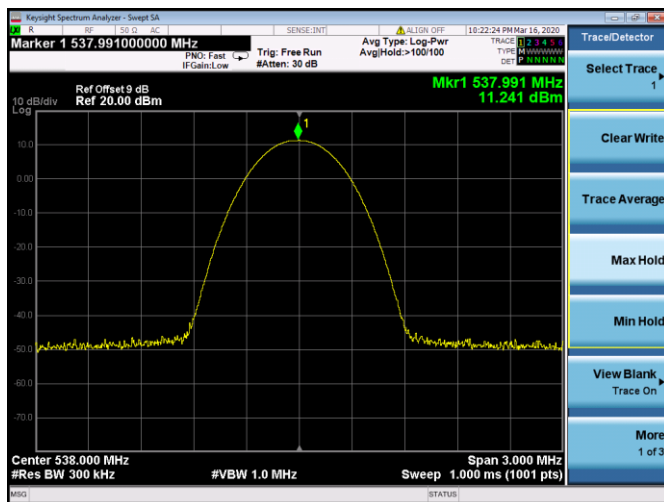
High Power						
Test Mode	Channel	Frequency (MHz)	Measured Maximum Peak Power(dBm)	Measured Maximum Average Power(dBm)	Limits Average (dBm)	Verdict
FM	01	566.4	11.235	/	24	PASS
	25	576.0	11.824	/		
	50	586.0	11.525	/		

Low Power						
Test Mode	Channel	Frequency (MHz)	Measured Maximum Peak Power(dBm)	Measured Maximum Average Power(dBm)	Limits Average (dBm)	Verdict
FM	01	538.0	8.302	/	24	PASS
	25	547.6	8.691	/		
	50	557.6	8.311	/		

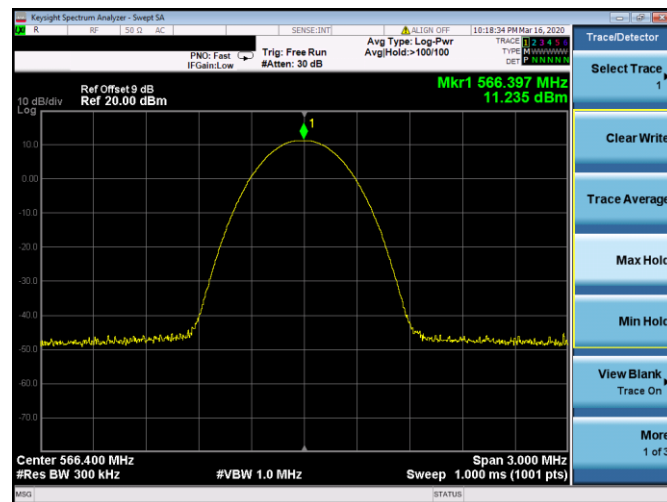
Low Power						
Test Mode	Channel	Frequency (MHz)	Measured Maximum Peak Power(dBm)	Measured Maximum Average Power(dBm)	Limits Average (dBm)	Verdict
FM	01	566.4	8.927	/	24	PASS
	25	576.0	8.198	/		
	50	586.0	8.176	/		

Maximum Peak Output Power High Power

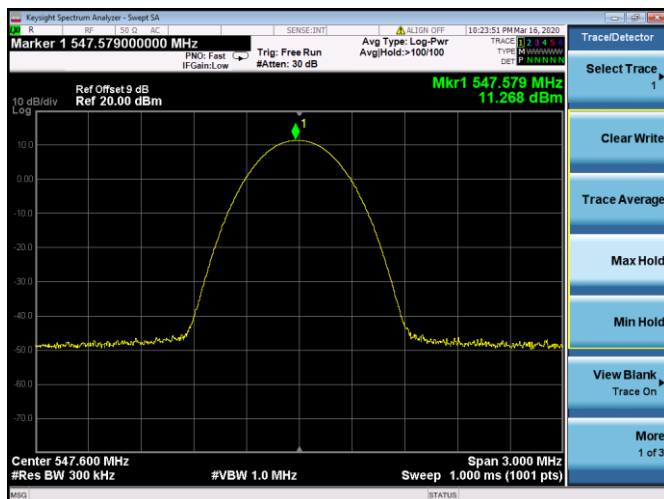
Channel A



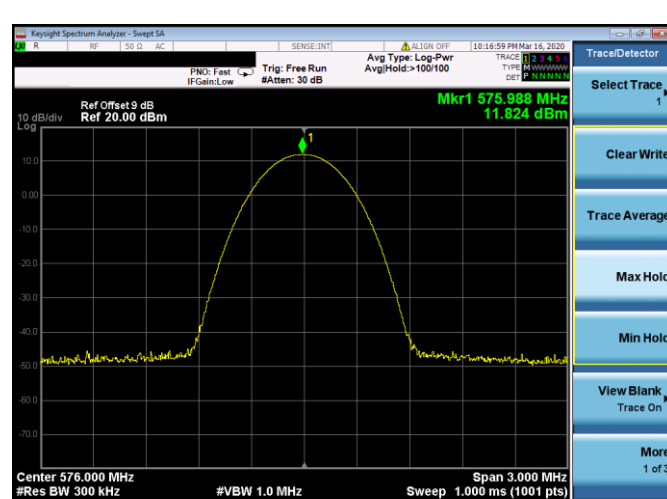
Channel B



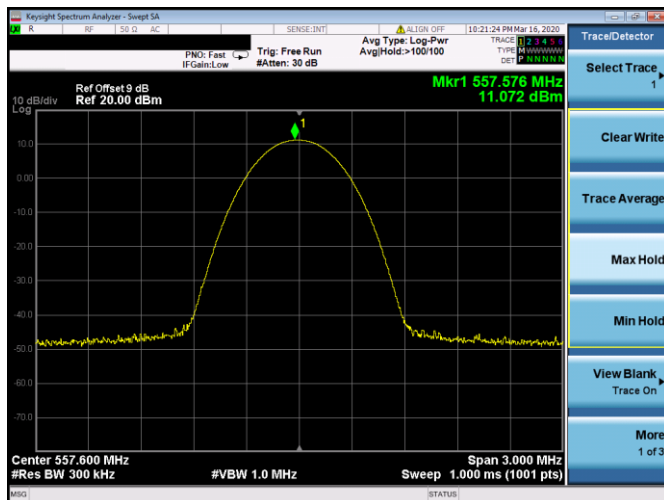
Channel 1 / 538.0 MHz



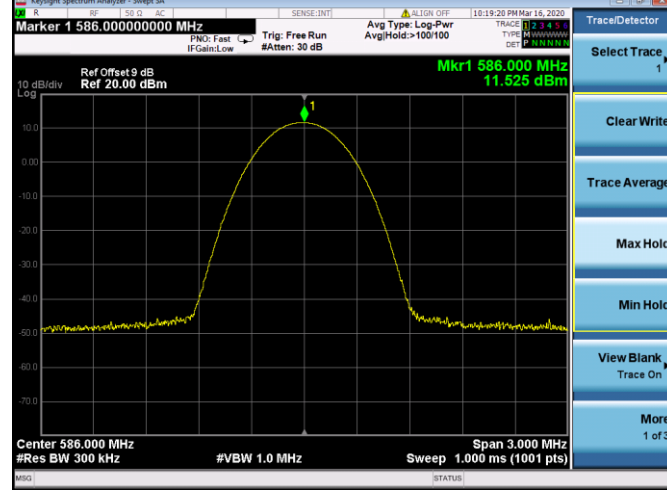
Channel 1 / 566.4MHz



Channel 25 / 547.6 MHz



Channel 1 / 576.0 MHz



Channel 50 / 557.6 MHz



Channel 1 / 586.0 MHz

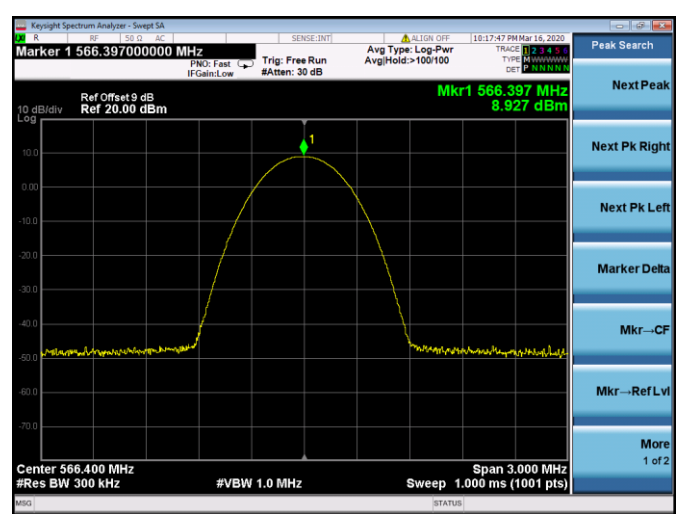
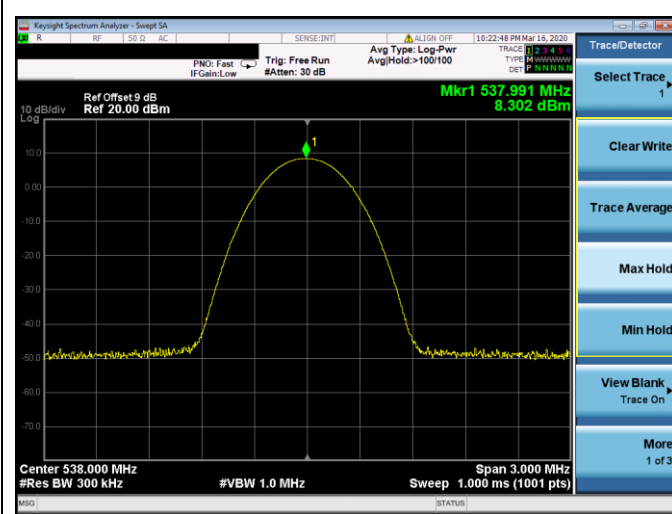


Maximum Peak Output Power

Low Power

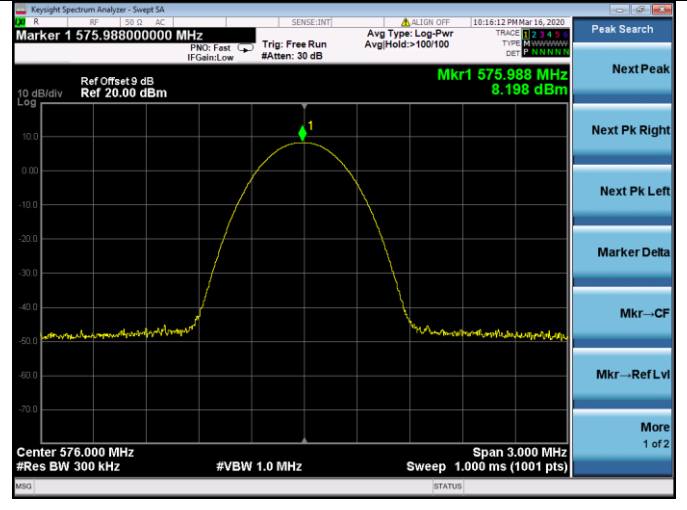
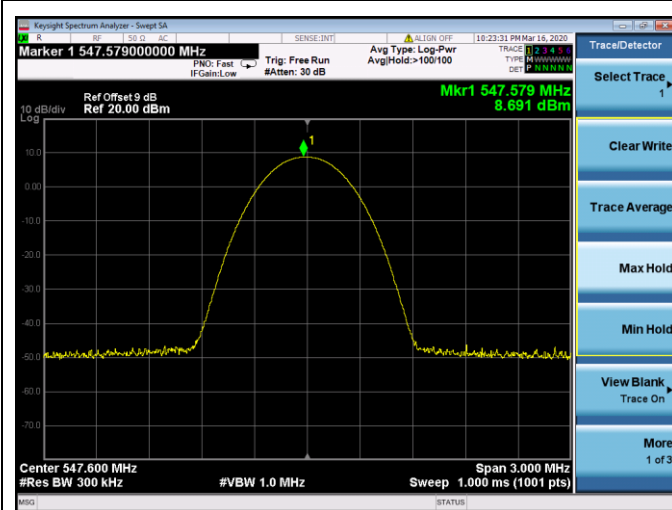
Channel A

Channel B



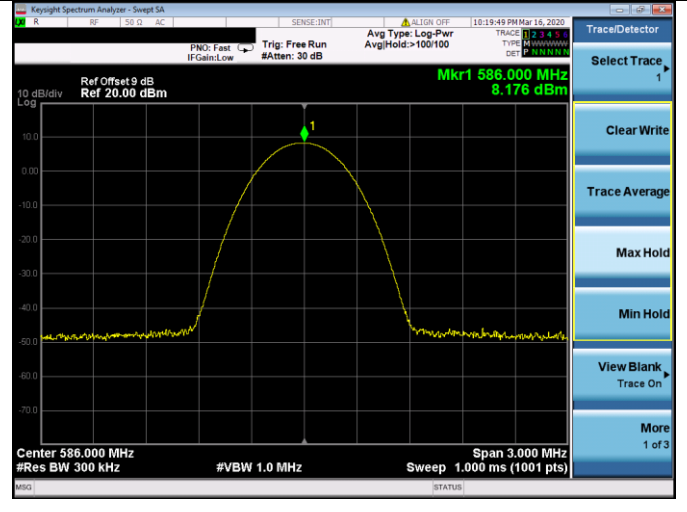
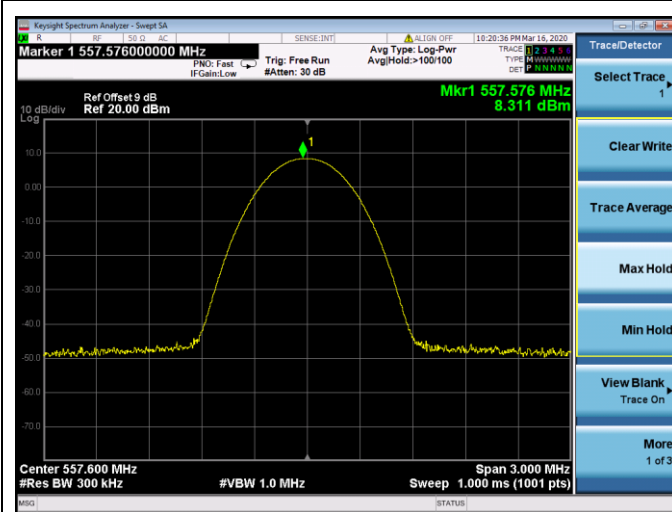
Channel 1 / 538.0 MHz

Channel 1 / 566.4MHz



Channel 25 / 547.6 MHz

Channel 1 / 576.0 MHz



Channel 50 / 557.6 MHz

Channel 1 / 586.0 MHz

4.4. Occupied bandwidth and Emission Mask

Measurement description

Two traces are captured to show the difference between input- and output signals and to measure the effective bandwidth of the output signal. Trace 1 shows the measurement results of the output signal and trace 2 shows the measurement results of the input signal.

Measurement

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 % to 5 % of the occupied bandwidth
Video bandwidth:	3 x resolution bandwidth
Span:	2 x emission bandwidth
Trace mode:	Max. hold
Analyzer function:	99% power occupied bandwidth function
EUT:	Modulated signal with max. frequency deviation

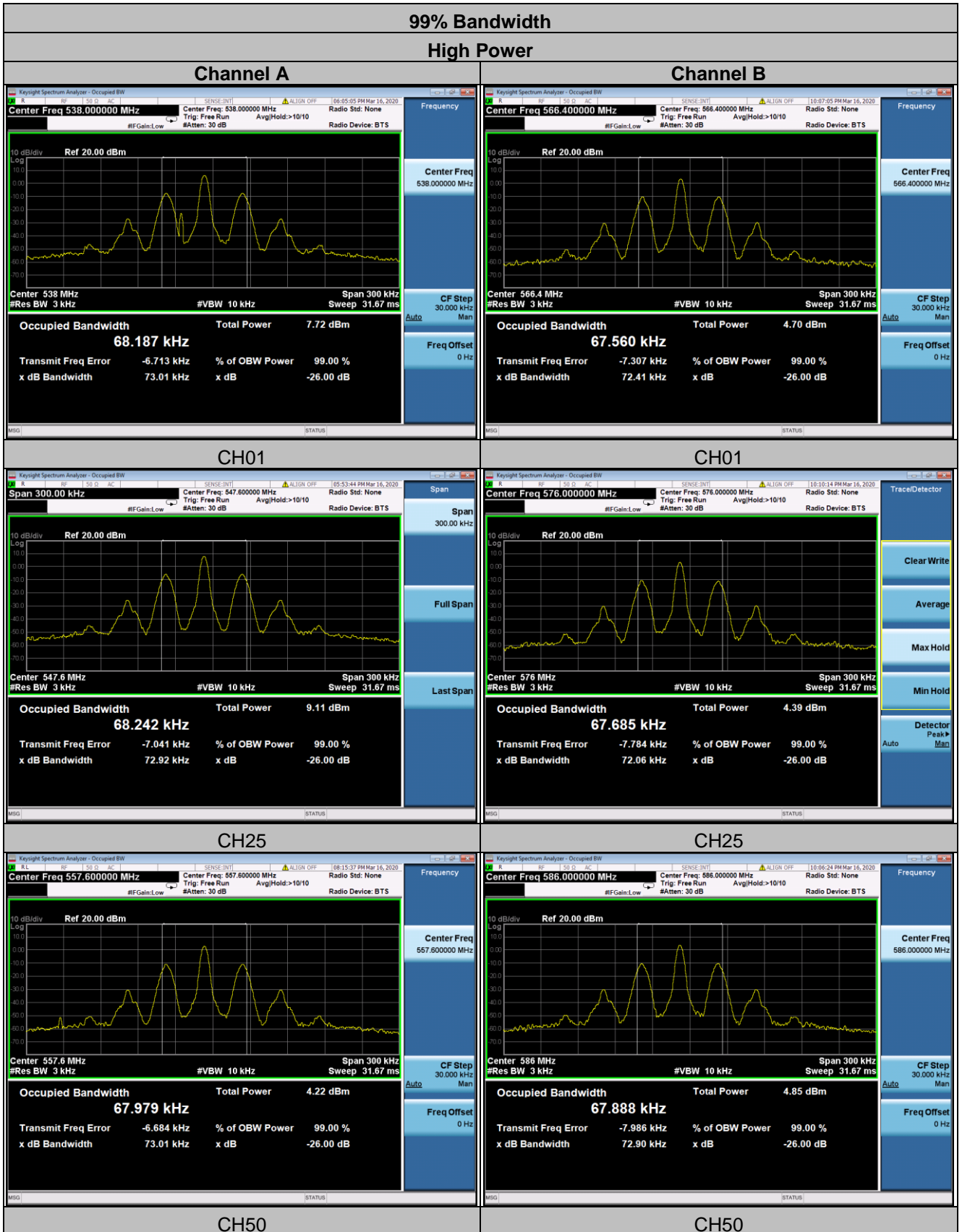
TEST RESULTS

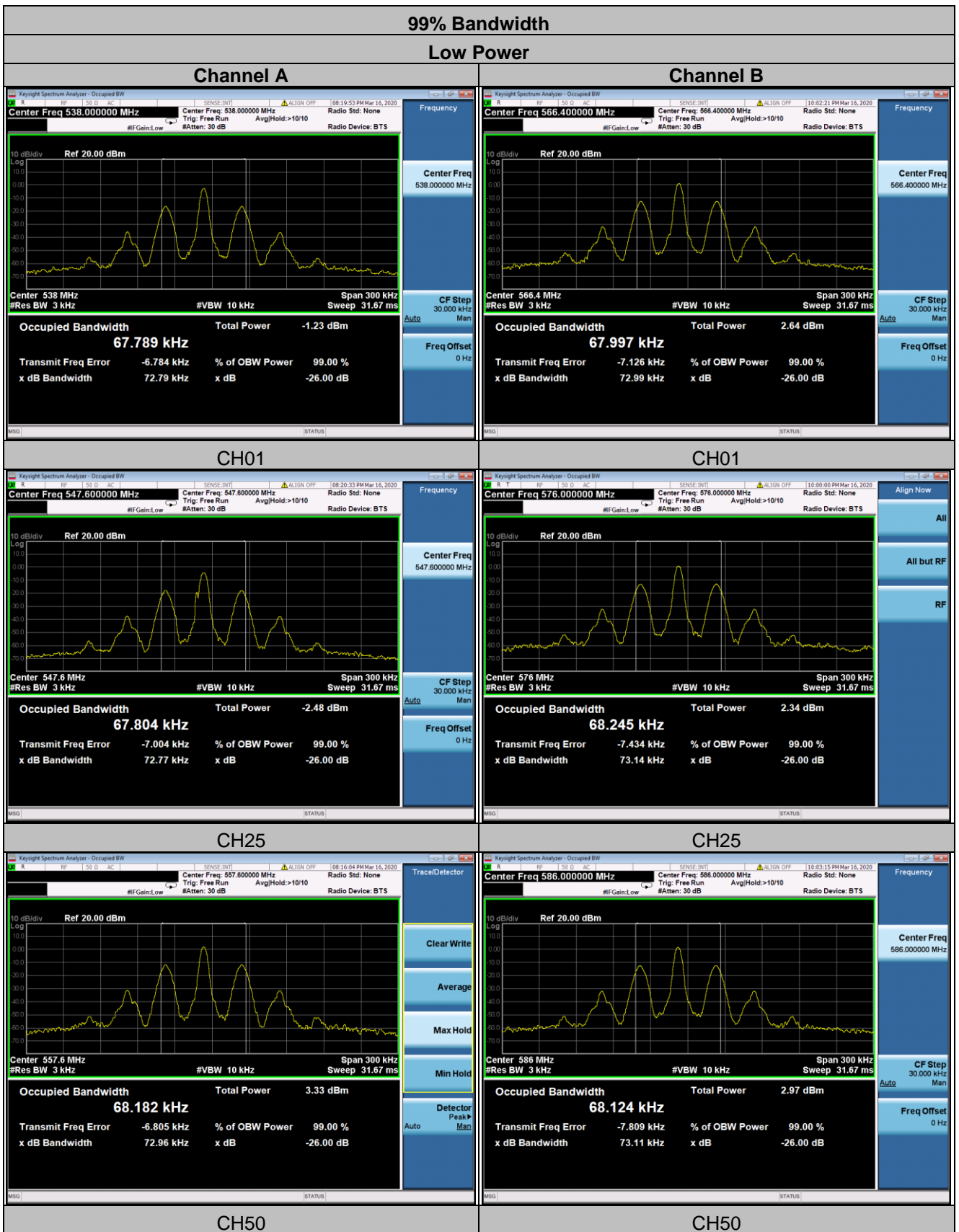
High Power				
Modulation	Frequency (MHz)	99% Bandwidth(KHz)	Limits (KHz)	Result
FM	538.0	68.187	200	PASS
	547.6	68.242		PASS
	557.6	69.979		PASS

High Power				
Modulation	Frequency (MHz)	99% Bandwidth(KHz)	Limits (KHz)	Result
FM	566.4	67.560	200	PASS
	576.0	67.685		PASS
	586.0	67.888		PASS

Low Power				
Modulation	Frequency (MHz)	99% Bandwidth(KHz)	Limits (KHz)	Result
FM	538.0	67.789	200	PASS
	547.6	67.804		PASS
	557.6	68.182		PASS

Low Power				
Modulation	Frequency (MHz)	99% Bandwidth(KHz)	Limits (KHz)	Result
FM	566.4	67.997	200	PASS
	576.0	68.245		PASS
	586.0	68.124		PASS





4.5. Frequency Stability

Test Requirement:FCC CFR 47 Part 74.e) 4)

Test Method:FCC CFR 47 Part 2.1055

Requirements:+/-50 ppm

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(4) The frequency tolerance of the transmitter shall be 0.005 percent.

Test Procedure:

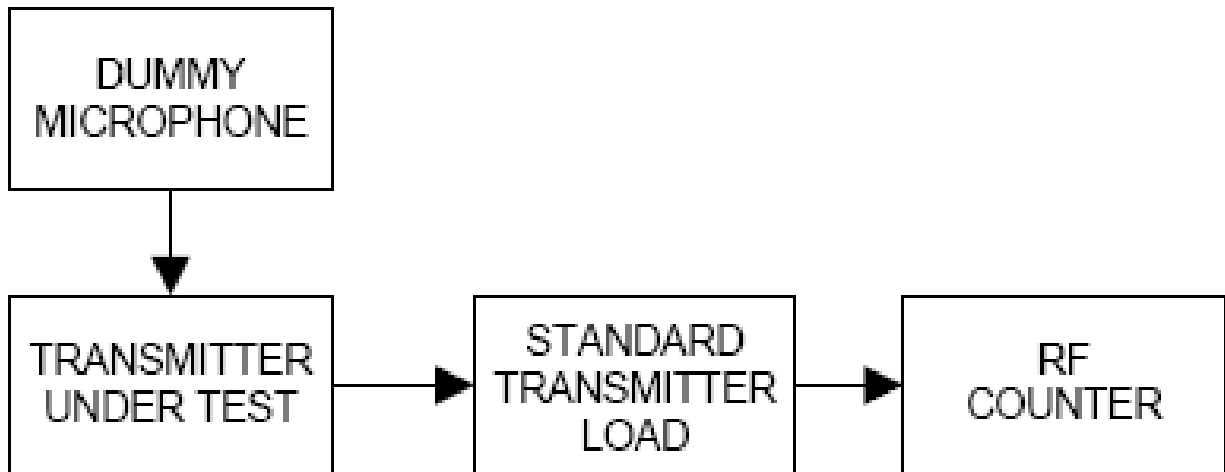
Frequency stability versus Environmental Temperature

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators.

The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

Frequency Stability versus Input Voltage

At room temperature ($25 \pm 5^{\circ}\text{C}$), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage. For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



TEST RESULTS

High Power		
Assigned Frequency: 538.000 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 26.90 kHz
50	3.0	+8.5
40	3.0	+7.3
30	3.0	+5.2
20	3.0	+3.2
10	3.0	-0.7
0	3.0	-2.6
-10	3.0	-3.1
-20	3.0	-4.7
-30	3.0	-5.4
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 26.90 kHz
25	3.0	+1.2
25	2.7	-1.5
25	2.7	-1.9

High Power		
Assigned Frequency: 547.600 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 27.38 kHz
50	3.0	+8.9
40	3.0	+7.6
30	3.0	+5.5
20	3.0	+4.2
10	3.0	-0.7
0	3.0	-1.3
-10	3.0	-2.7
-20	3.0	-3.9
-30	3.0	-4.5
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 27.38 kHz
25	3.0	+2.5
25	2.7	-1.8
25	2.7	-2.7

High Power		
Assigned Frequency: 557.600 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 27.88 kHz
50	3.0	+8.6
40	3.0	+7.5
30	3.0	+6.4
20	3.0	+4.5
10	3.0	3.4
0	3.0	-1.7
-10	3.0	-2.5
-20	3.0	-3.7
-30	3.0	-4.9
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 27.88 kHz
25	3.0	+1.6
25	2.7	-2.3
25	2.7	-3.4

High Power		
Assigned Frequency: 566.400 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 28.32 kHz
50	3.0	+8.8
40	3.0	+7.6
30	3.0	+5.3
20	3.0	+3.4
10	3.0	-0.7
0	3.0	-1.6
-10	3.0	-2.7
-20	3.0	-3.9
-30	3.0	-5.5
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 28.32 kHz
25	3.0	+1.7
25	2.7	-2.1
25	2.7	-2.5

High Power		
Assigned Frequency: 576.000 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 28.80 kHz
50	3.0	+7.8
40	3.0	+6.3
30	3.0	+3.7
20	3.0	+2.2
10	3.0	-1.0
0	3.0	-2.4
-10	3.0	-2.9
-20	3.0	-3.3
-30	3.0	-4.7
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 28.80 kHz
25	3.0	+2.5
25	2.7	-1.9
25	2.7	-2.7

High Power		
Assigned Frequency: 586.000 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 29.30 kHz
50	3.0	+7.2
40	3.0	+6.3
30	3.0	+5.2
20	3.0	+2.8
10	3.0	-1.4
0	3.0	-3.6
-10	3.0	-4.1
-20	3.0	-4.9
-30	3.0	-5.8
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 29.30 kHz
25	3.0	+1.4
25	2.7	-1.7
25	2.7	-2.2

Low Power		
Assigned Frequency: 538.000 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 26.90 kHz
50	3.0	+8.9
40	3.0	+7.5
30	3.0	+5.3
20	3.0	+2.2
10	3.0	-1.3
0	3.0	-2.6
-10	3.0	-3.3
-20	3.0	-3.8
-30	3.0	-4.6
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 26.90 kHz
25	3.0	+1.6
25	2.7	-2.2
25	2.7	-2.7

Low Power		
Assigned Frequency: 547.600 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 27.38 kHz
50	3.0	+7.9
40	3.0	+6.8
30	3.0	+5.5
20	3.0	+1.8
10	3.0	-1.5
0	3.0	-2.4
-10	3.0	-4.7
-20	3.0	-4.9
-30	3.0	-5.3
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 27.38 kHz
25	3.0	+2.3
25	2.7	-1.5
25	2.7	-2.4

Low Power		
Assigned Frequency: 557.600 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 27.88 kHz
50	3.0	+8.1
40	3.0	+6.9
30	3.0	+5.5
20	3.0	+4.2
10	3.0	-1.2
0	3.0	-2.5
-10	3.0	-2.8
-20	3.0	-3.7
-30	3.0	-4.9
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 27.88 kHz
25	3.0	+1.4
25	2.7	-2.1
25	2.7	-2.5

Low Power		
Assigned Frequency: 566.400 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 28.32 kHz
50	3.0	+7.9
40	3.0	+6.3
30	3.0	+6.5
20	3.0	+5.7
10	3.0	-4.5
0	3.0	-3.7
-10	3.0	-4.8
-20	3.0	-5.7
-30	3.0	-5.9
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 28.32 kHz
25	3.0	+2.7
25	2.7	-2.3
25	2.7	-3.5

Low Power		
Assigned Frequency: 576.000 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 28.80 kHz
50	3.0	+8.6
40	3.0	+6.9
30	3.0	+5.3
20	3.0	+4.2
10	3.0	-3.7
0	3.0	-4.7
-10	3.0	-5.2
-20	3.0	-5.6
-30	3.0	-5.9
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 28.80 kHz
25	3.0	+2.7
25	2.7	-2.3
25	2.7	-2.9

Low Power		
Assigned Frequency: 586.000 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 29.30 kHz
50	3.0	+8.3
40	3.0	+6.6
30	3.0	+6.1
20	3.0	+4.2
10	3.0	-3.7
0	3.0	-4.2
-10	3.0	-4.8
-20	3.0	-5.4
-30	3.0	-6.7
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 29.30 kHz
25	3.0	+3.1
25	2.7	-2.5
25	2.7	-3.6

Battery end point: 2.7Vdc

The results: The unit does meet the FCC requirements.

4.6. Modulation Characteristics

Test Requirement:FCC CFR 47 Part 74.e) 3)

Test Method:FCC CFR 47 Part 2.1047 & TIA/EIA 603 E 2016:Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

Requirements:

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

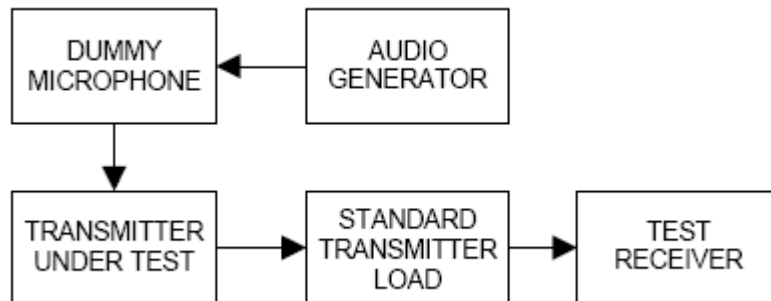
(3) Any form of modulation may be used. A maximum deviation of ± 75 kHz is permitted when frequency modulation is employed.

Test Procedure:

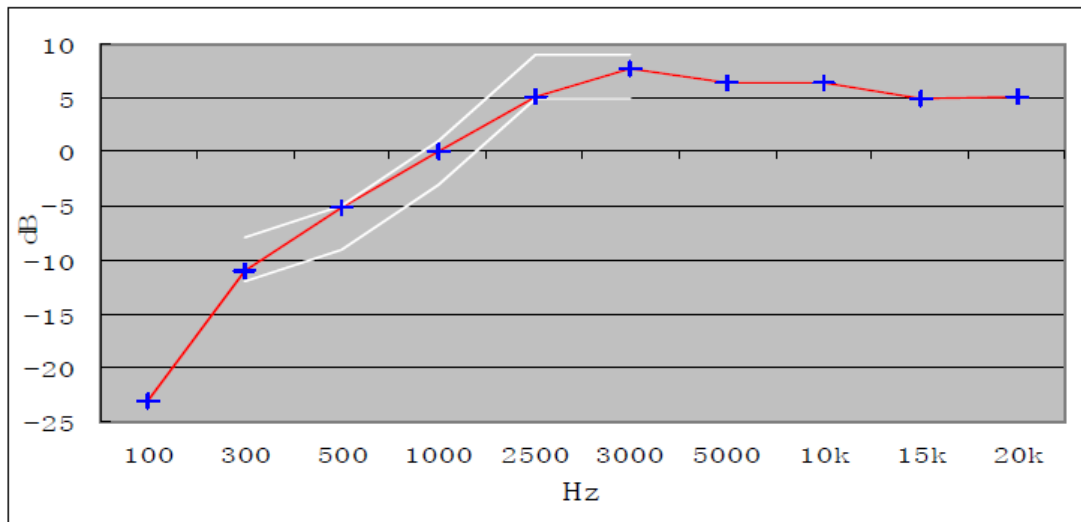
Audio Frequency Response

The RF output of the transceiver was connected to the input of FSP 30 with FM deviation module through sufficient attenuation so as not to overload the meter or distort the reading. An audio signal generator was connected to the audio input of microphone.

The audio signal input level was adjusted to obtain 20% of the maximum rated system deviation at 1 kHz, and recorded as DEV REF . With the audio signal generator level unchanged, set the generator frequency between 100 to 5000 Hz. The transmitter deviations (DEV FREQ) were measured and the audio frequency response was calculated as $20\log_{10} [DEV FREQ / DEV REF]$



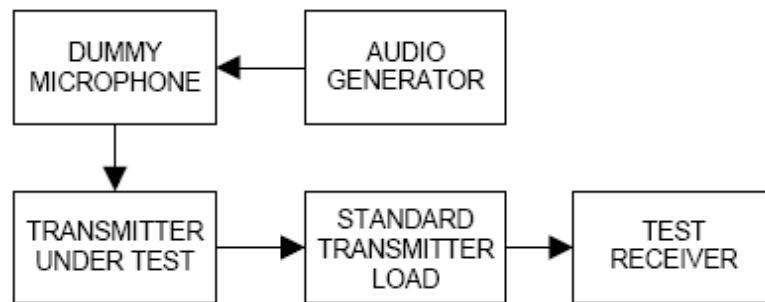
The plot(s) of Audio Frequency Response is presented hereinafter as reference.



0dB=10mV at 1kHz (20% of the maximum rated system deviation).

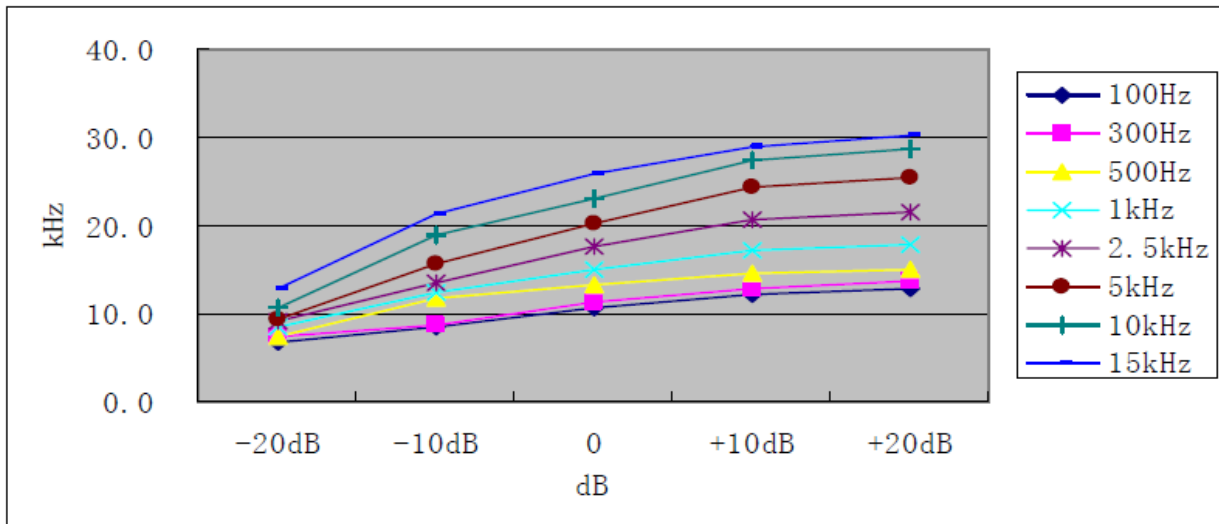
Modulation Limiting

1. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 0.25 Hz to $\geq 15,000$ Hz. Turn the de-emphasis function off.
2. Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
3. Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).
4. Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
5. With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 100 to 15k Hz and observe the steady-state deviation. Record the maximum deviation.



Test at five different modulating frequencies (100Hz ,300Hz, 500Hz, 1KHz, 2.5kHz, 5kHz, 10kHz,15kHz), the output level of the audio generator was varied up to 1V and the FM deviation level was recorded.

Positive peak deviation:

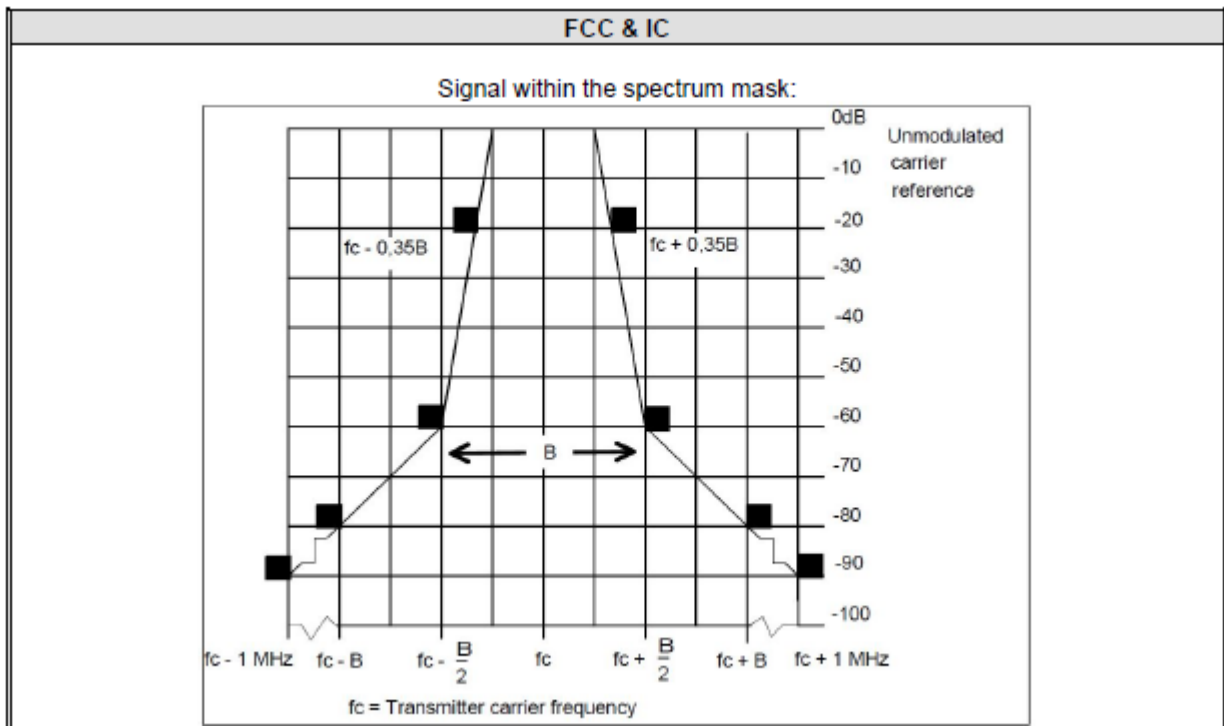


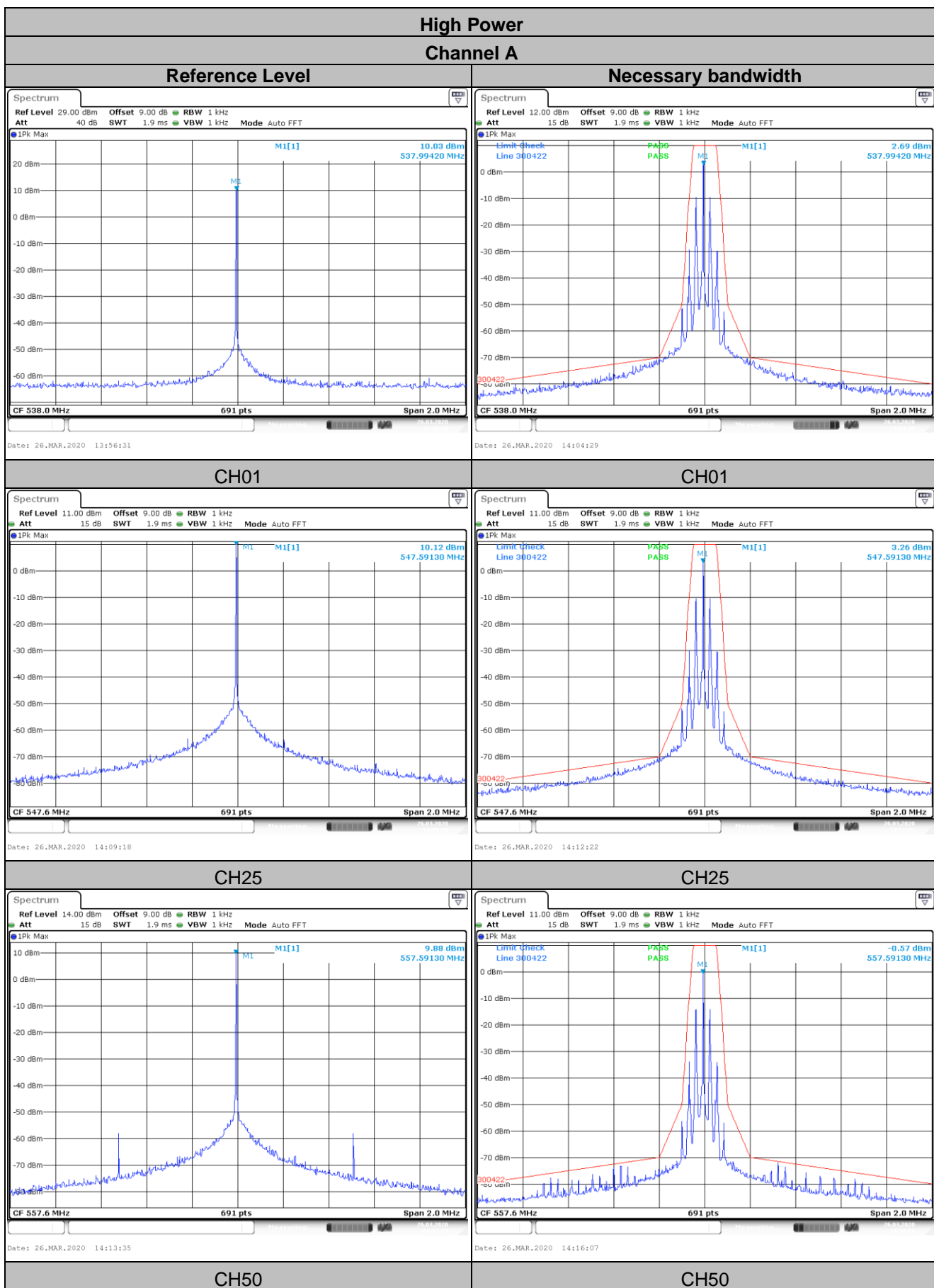
4.7. Necessary bandwidth (BN) for analogue systems

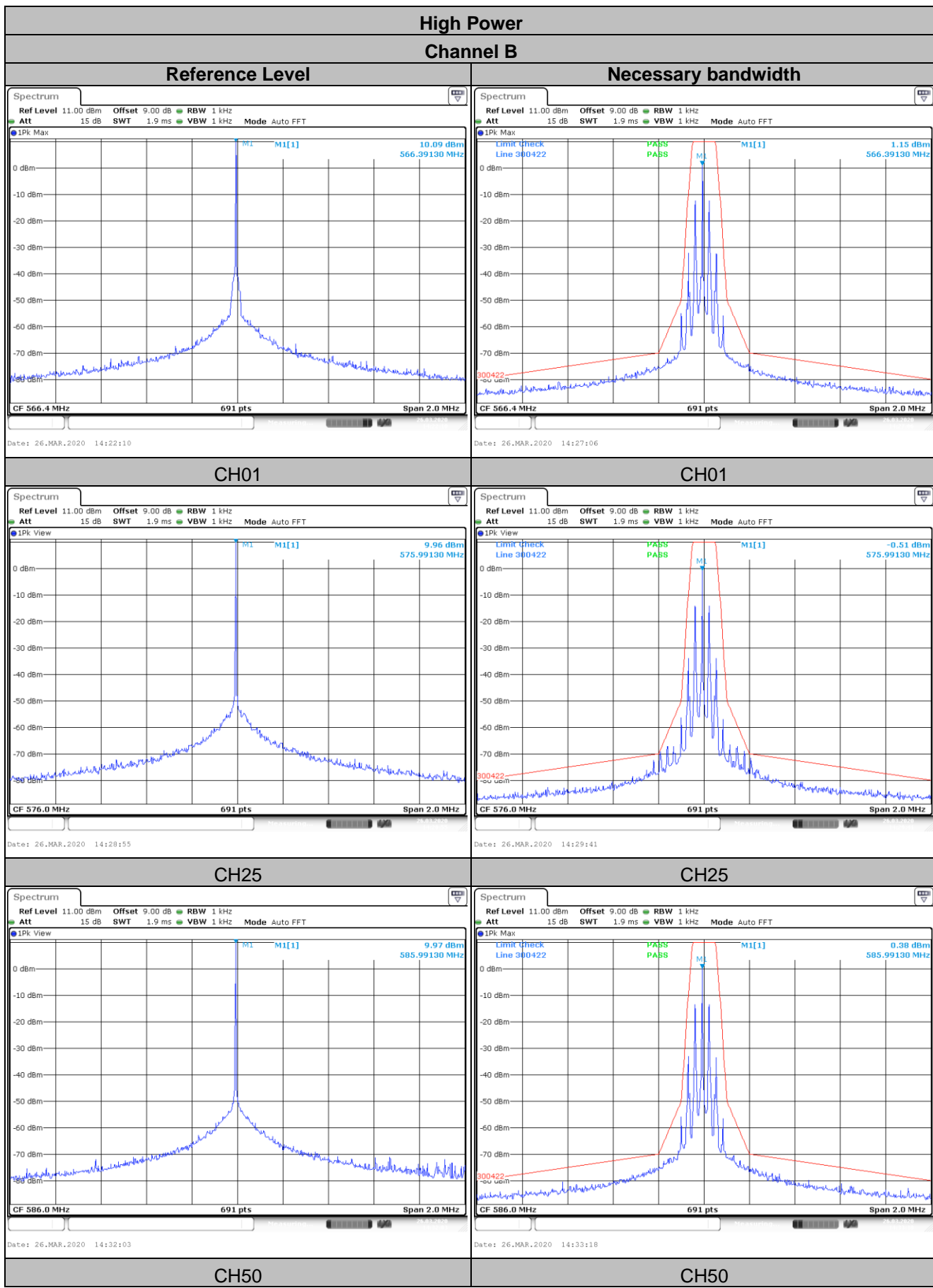
Measurement

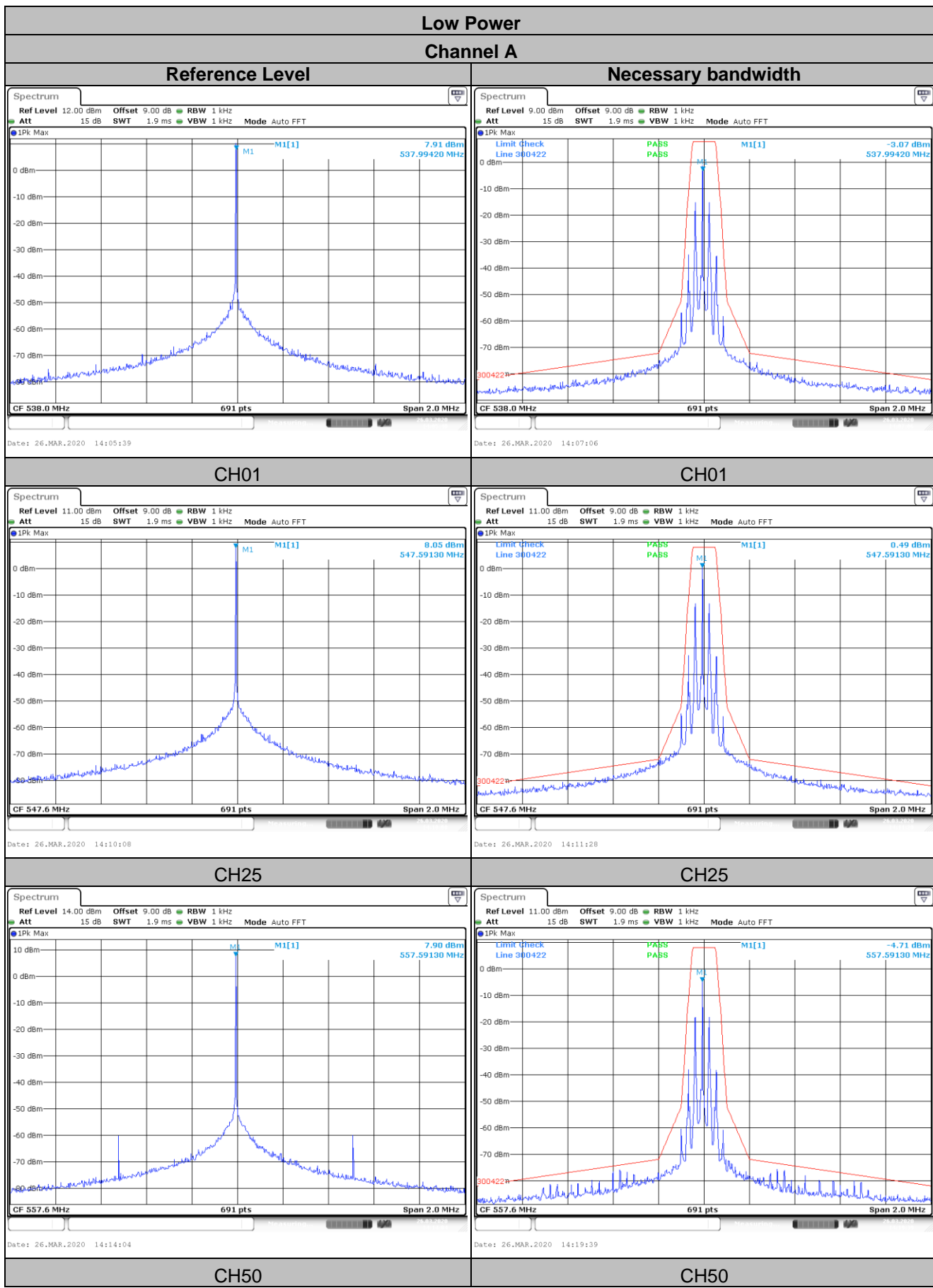
Measurement parameter	
Detector:	Peak - Quasi Peak / Average
Sweep time:	Auto
Resolution bandwidth:	1 kHz
Video bandwidth:	1 kHz
Span:	Fc-1MHz to fc+1MHz(2MHz)
Trace mode:	Max Hold

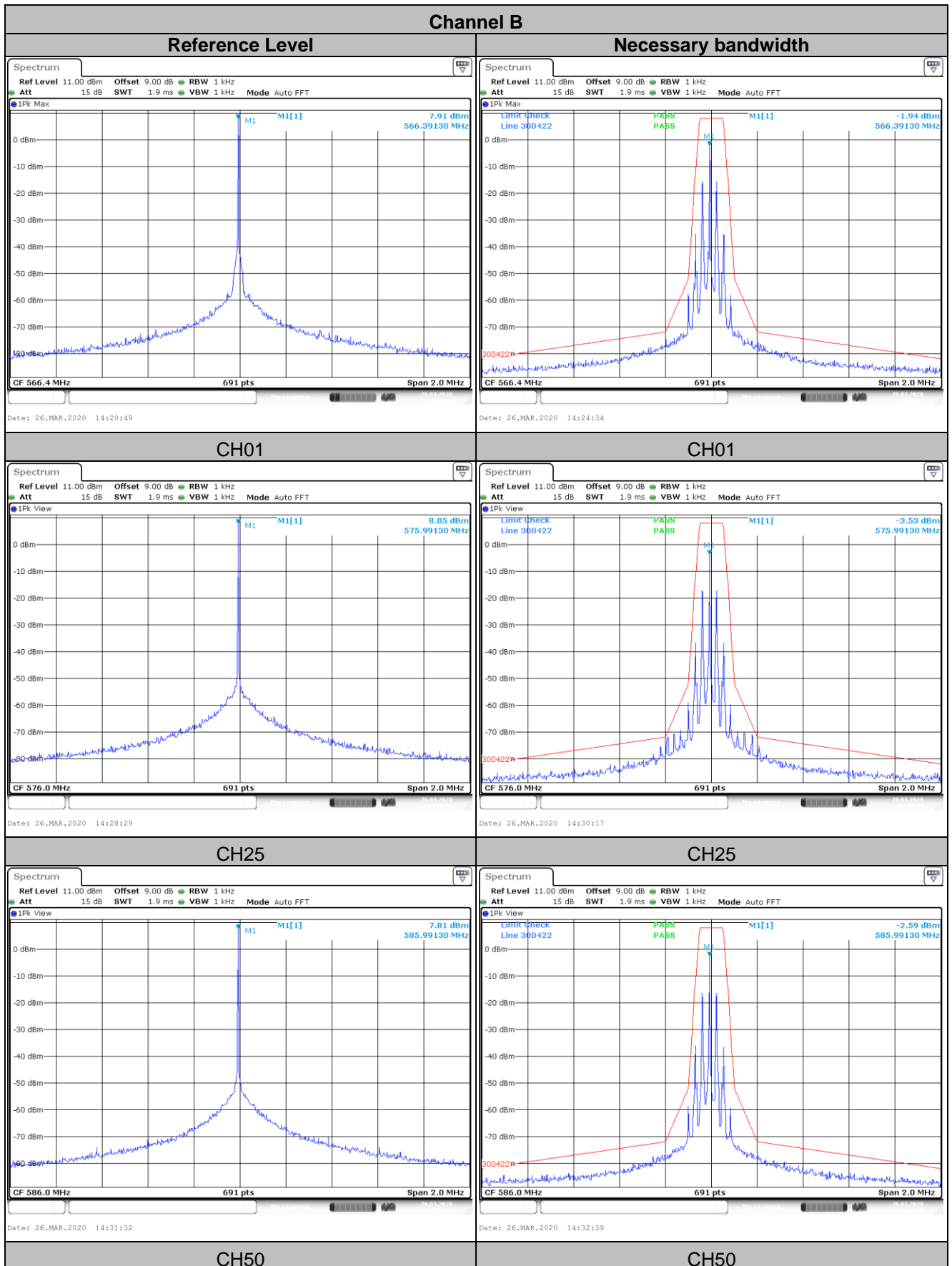
LIMIT











5. TEST SETUP PHOTOS OF THE EUT

Photo of Radiated Emissions Measurement

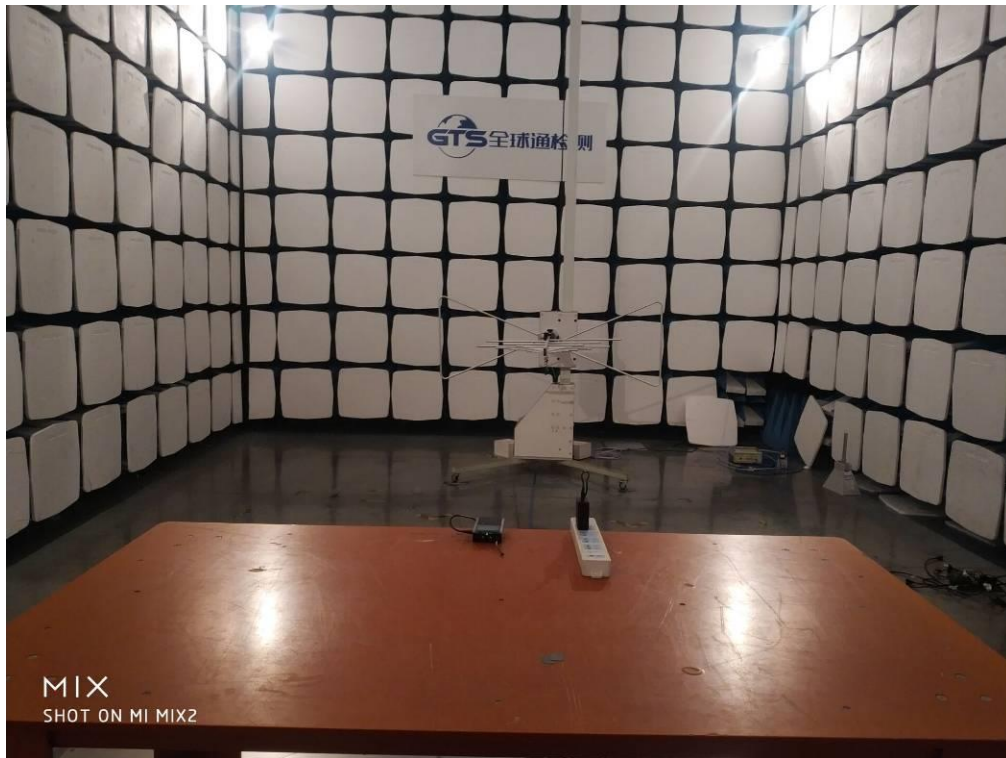


Fig. 1



Fig. 2

Photo of Conducted Emission Measurement



Fig. 3

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

6.1. External photos of the EUT



Fig. 1



Fig. 2



Fig. 3



Fig. 4

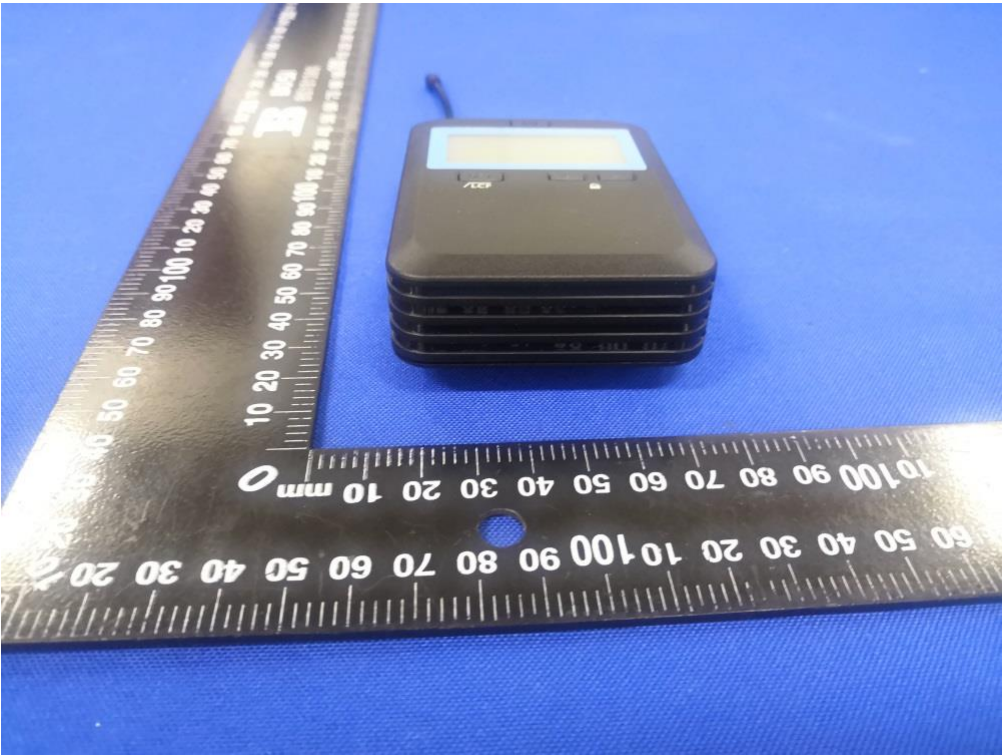


Fig. 5

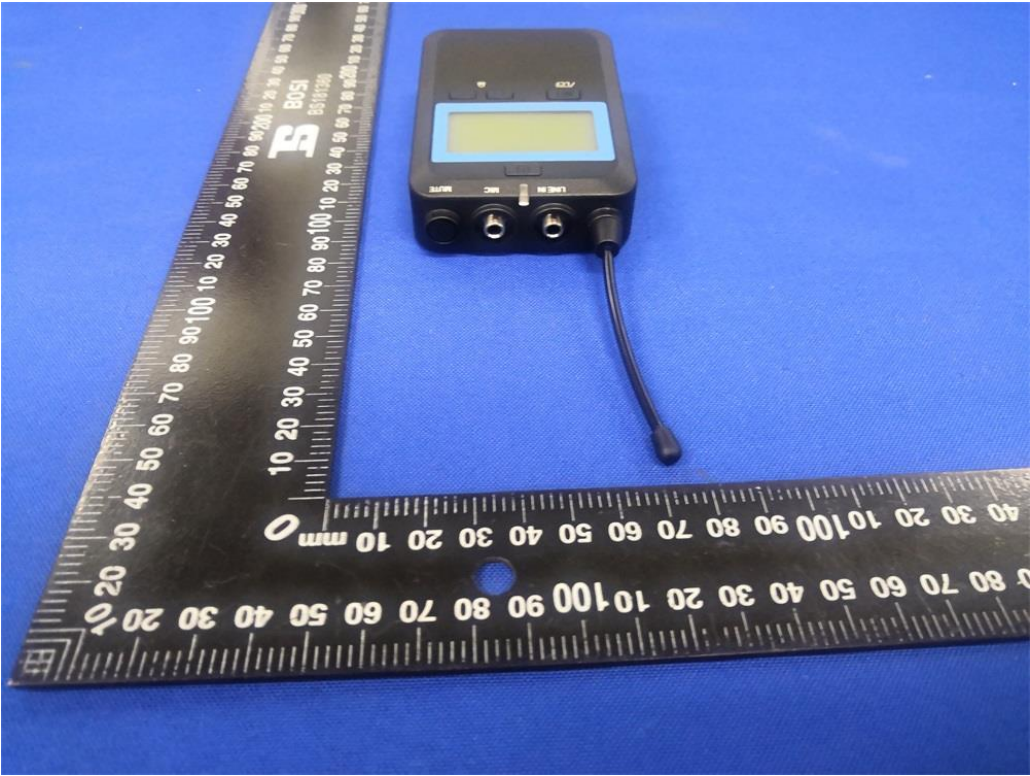


Fig. 6

6.2.Internal photos of the EUT



Fig. 7

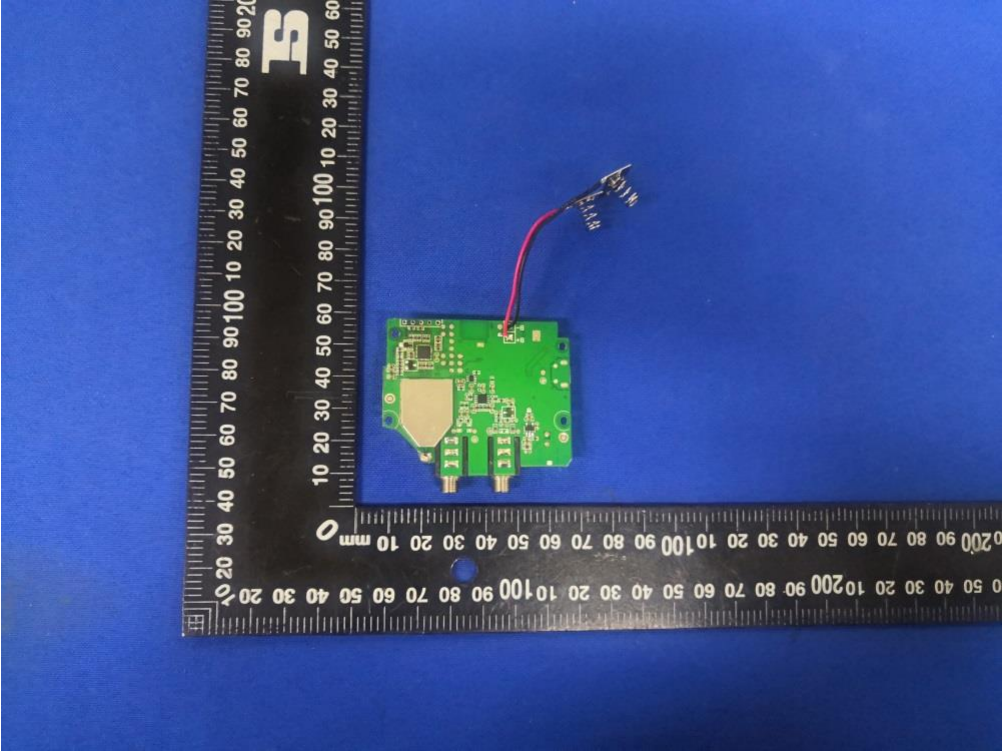


Fig. 8

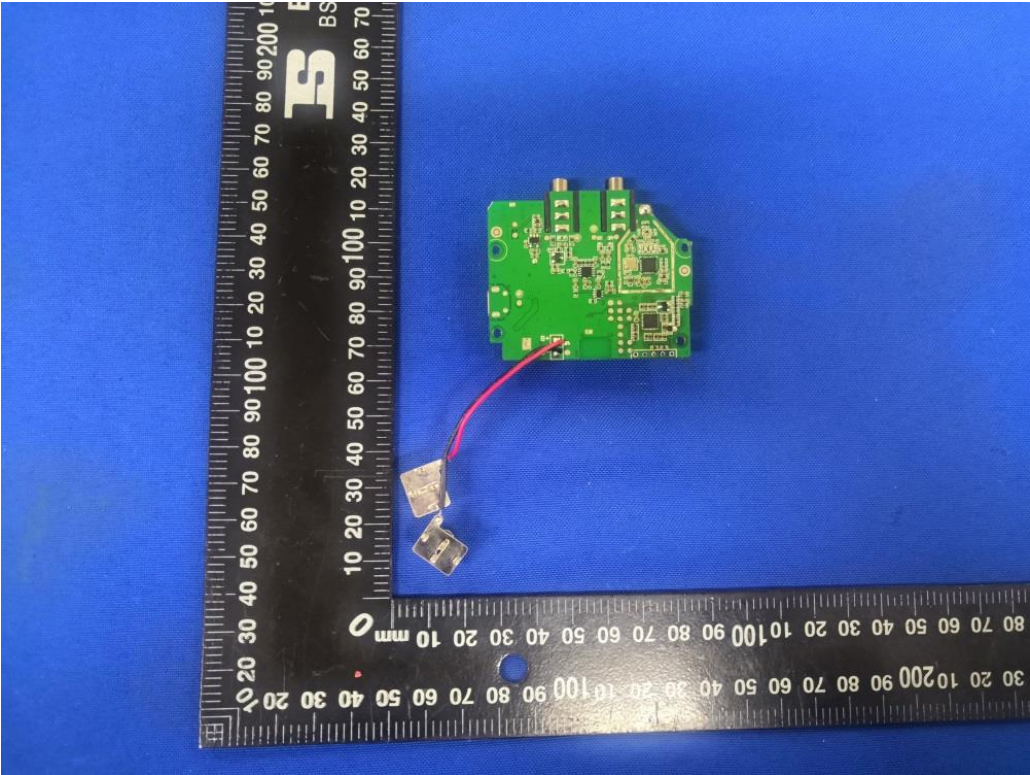


Fig. 9

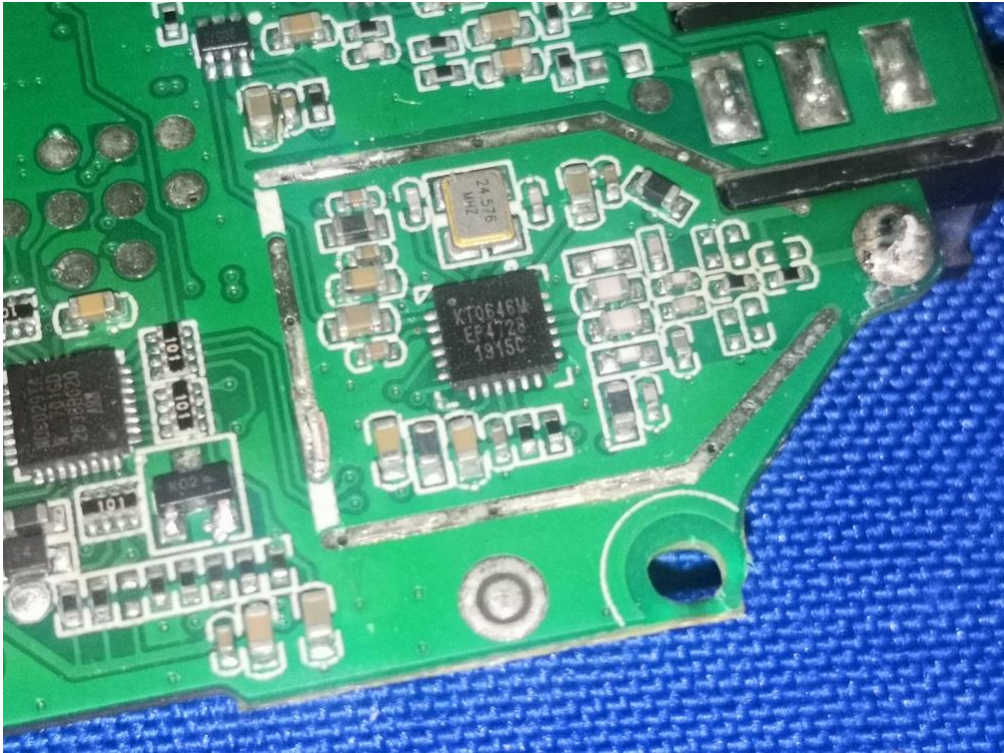


Fig. 10

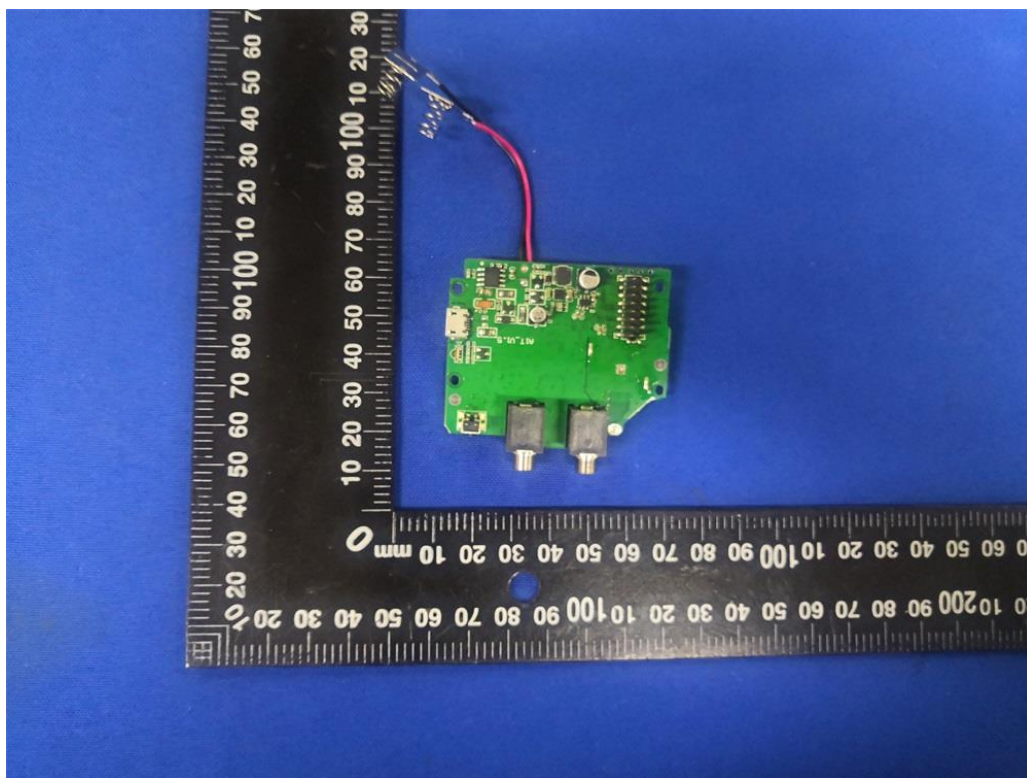


Fig. 11

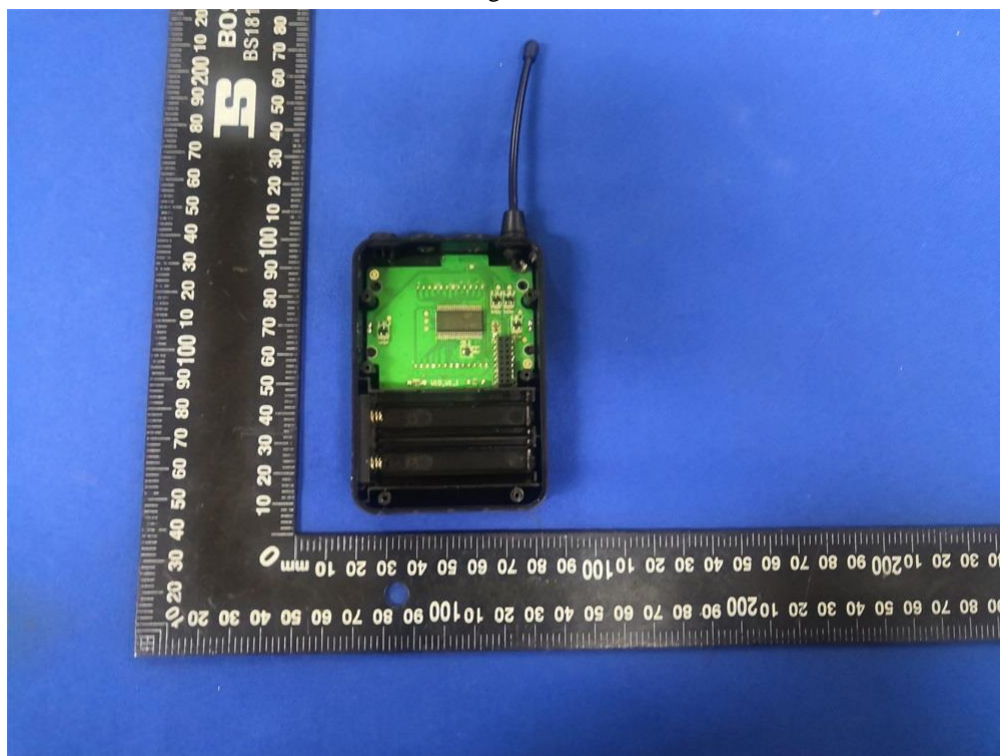


Fig. 12

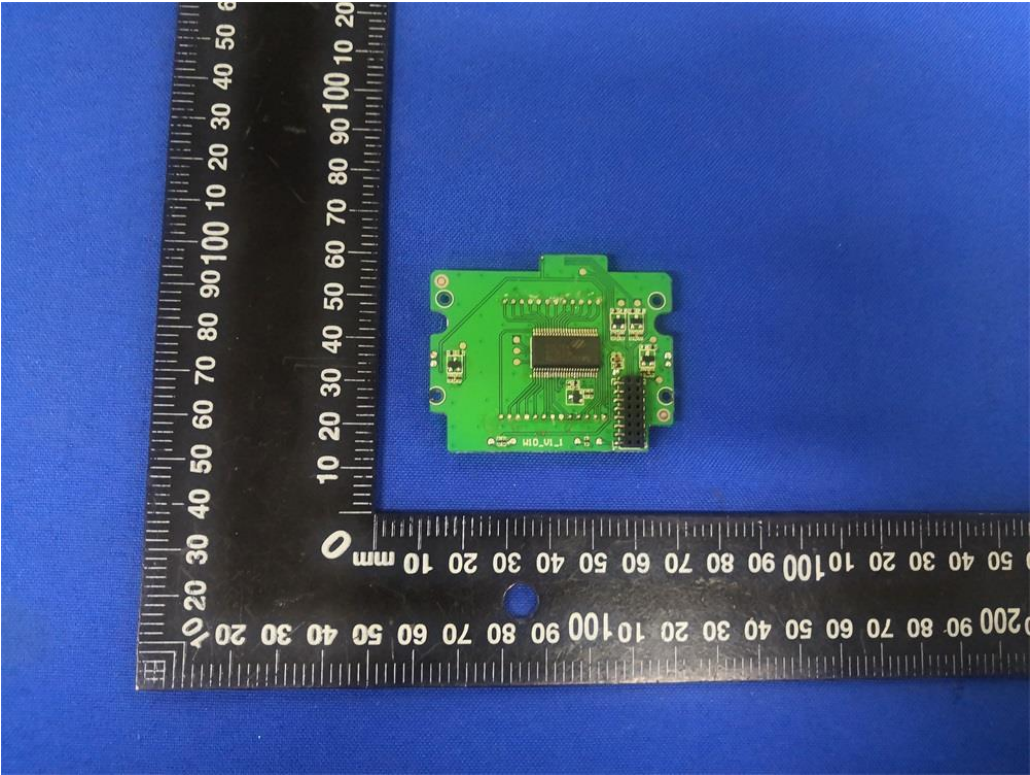


Fig. 13

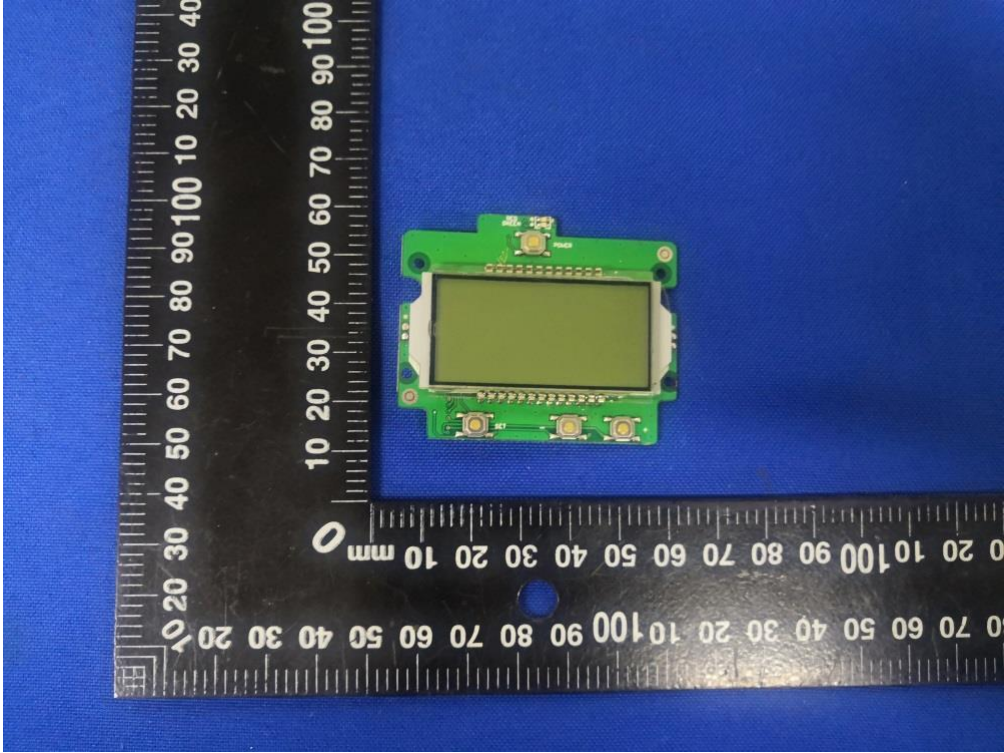


Fig. 14

.....End of Report.....