



Test Report

Date : 2020-09-28
No. : HM20110018

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Applicant: inMusic Brands Inc
200 Scenic View Drive Cumberland,
RI 02864 USA

Manufacturer: inMusic Brands Inc
200 Scenic View Drive Cumberland,
RI 02864 USA

Description of Sample(s): Submitted sample(s) said to be
Product: Bluetooth Receiver with XLR outputs
Brand Name: 
ALTO PROFESSIONAL
Model No.: BLUETOOTH® TOTAL MK2
FCC ID: Y4O-TBT2

Date Samples Received: 2020-08-24

Date Tested: 2020-09-02 to 2020-09-12

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2018 and ANSI C63.10:2013 for FCC Certification.

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: FCC C2PC



Dr. LEE Kam Chuen,
Authorized Signatory



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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.

EMC Laboratory

Head Office: 10 Dai Wang Street, Taipo Industrial Estate, Tai Po, N.T., Hong Kong

Telephone: 852 2666 1888

Fax: 852 2664 4353

FCC Test Firm Registration Number 723883

Designation Number HK0001

1.2 Equipment Under Test [EUT]

Description of Sample(s)

Product Name: Bluetooth Receiver with XLR outputs
Manufacturer: inMusic Brands Inc
200 Scenic View Drive Cumberland,
RI 02864 USA

Brand Name:



Model Number: ALTO PROFESSIONAL
Internal Product Code: BLUETOOTH® TOTAL MK2
TBT3
Rating: 3.7Vd.c Li-ion Battery (300mAh)
5Vd.c of USB port of EUT

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a 2.4GHz Bluetooth Audio Receiver. The tests were conducted under RF Test mode to maintain continuous transmission during test. The transmission signal is digital modulated with channel frequency range 2402-2480MHz. The R.F. signal was modulated by IC. The test mode was controlled by test software – “FCC_assist.exe” used during tests, which was provided by manufacturer.

1.3 Date of Order

2020-08-24

1.4 Submitted Sample(s):

2 Samples

1.5 Test Duration

2020-09-02 to 2020-09-12

1.6 Country of Origin

Not Provided

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1.7 RF Module Details

Module Model Number: SS-6904-M
Module FCC ID: N/A
Module Transmission Type: Bluetooth BR +EDR + BLE
Modulation: GFSK, $\pi/4$ -DQPSK
Data Rates: 2Mbps (Max)
Frequency Range: 2400-2483.5MHz
Carrier Frequencies: 2402MHz – 2480MHz

Module Specification (specification provided by manufacturer)

1.8 Channel List

Channel	Frequency (MHz)
0 – 78 (BR + EDR)	2402 – 2480
0 – 40 (BLE)	2402 – 2480

1.9 Permissive Change Information

This report is a supplementary report of report no. HM20080050 and HM20080062 class II permissive change. The EUT modification concerned with following:

	Original	Additional
Model no.	BLUETOOTH® ULTIMATE (Internal Product Code: TBT2)	BLUETOOTH® TOTAL MK2 (Internal Product Code: TBT3)
XLR port	2	1
Built-in rechargeable battery	Model: 503035 3.7V 500mAh	Model: 602030 3.7V 300mAh
Mono / Stereo switch	Yes	No

The modified parts do not affect RF performance, thus radiated emission and conducted emission tests applied and presented in the following sections.

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2018 Regulations. ANSI C63.10:2013 for FCC Certification. The device was realized by test software.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Radiated Spurious Emissions	FCC 47CFR 15.209	ANSI C63.10:2013	N/A	☒	☐	☐
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.10:2013	N/A	☒	☐	☐

Note: N/A - Not Applicable

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2.3 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate in the table below is the worst case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test software	FCC_assist.exe
Power level setting	10

Duty Cycle	
DH5	77%
2DH5	77%
BLE	85%

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3.0 Test Results

3.1 Emission

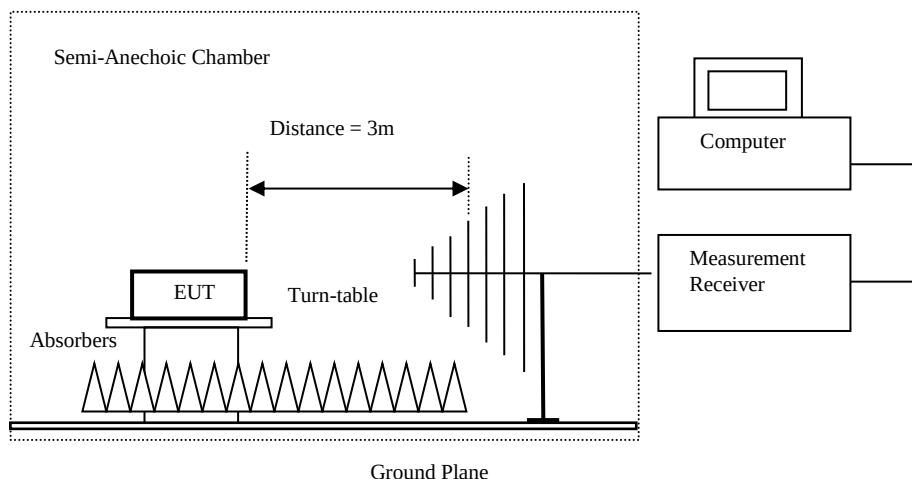
3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.209
Test Method:	ANSI C63.10:2013
Test Date:	2020-09-07
Mode of Operation:	Tx mode

Test Method:

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The measured field strength would be calculated as EIRP.

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.
- For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

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Limits for Radiated Emissions FCC 47 CFR 15.247 Class B]:

Frequency Range	Quasi-Peak Limits	
[MHz]	[μ V/m]	[dB μ V/m]
0.009-0.490	2400/F (kHz)	48.5 – 13.8
0.490-1.705	24000/F (kHz)	33.8 – 23.0
1.705-30	30	29.0
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above960	500	54.0

Frequency Range	Peak Limits	Average Limits
[MHz]	[dB μ V/m]	[dB μ V/m]
Above 1000	74.0	54.0

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Spectrum Analyzer and EMI Test Receiver setting parameters are referred to RSS-Gen, ANSI 63.10, KDB 558074 and CISPR 16-1-1

Frequency range	RBW	VBW
9 kHz to 150 kHz	200 Hz	3 x RBW
0.15 MHz to 30 MHz	9 kHz	
30 MHz to 1 000 MHz	120 kHz	
1 GHz to 40 GHz	1 MHz	

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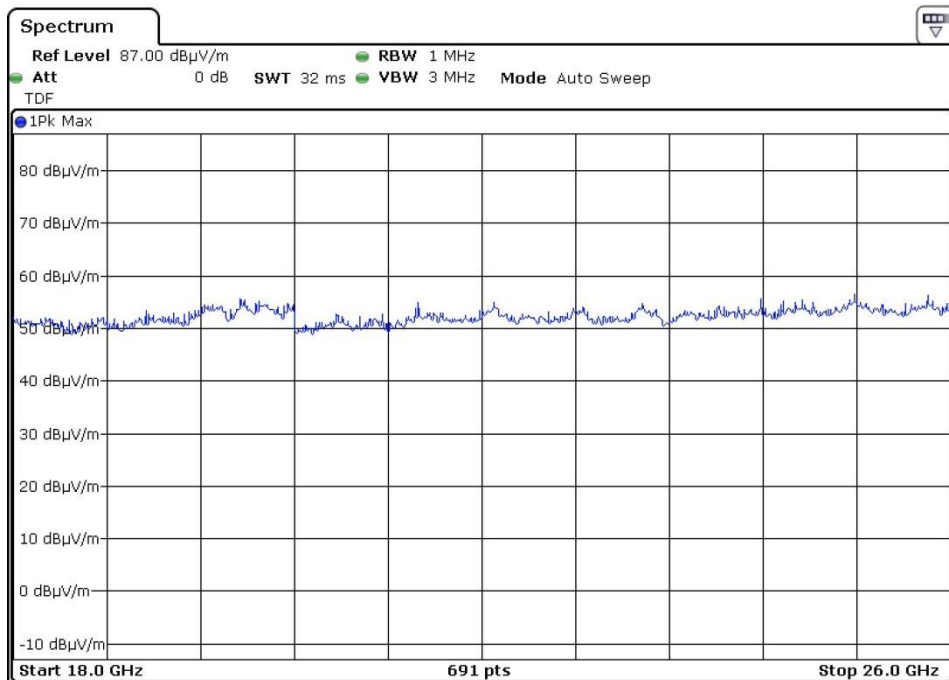
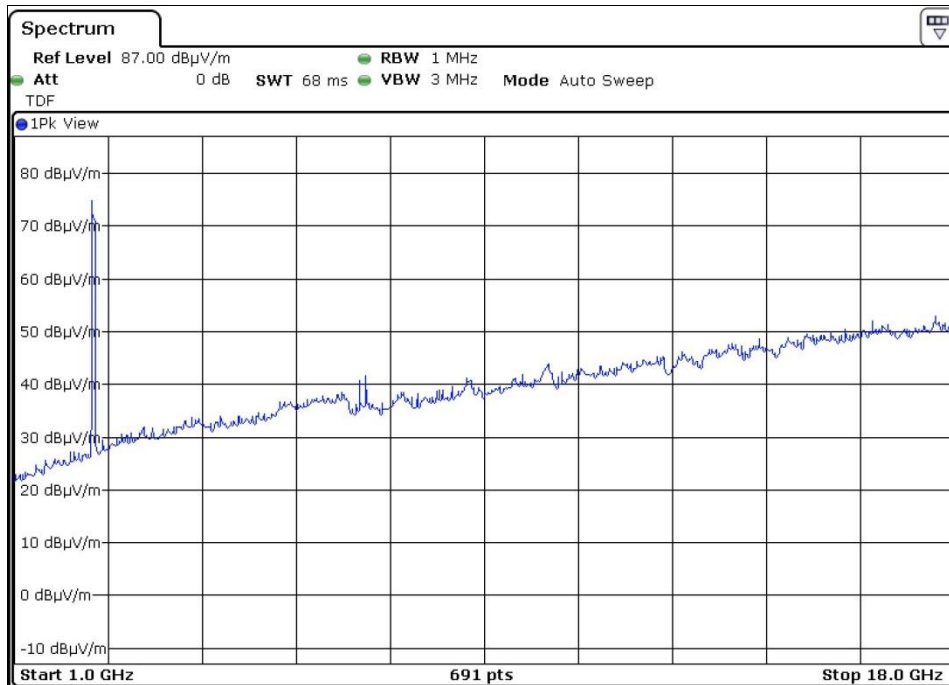
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Pre-scan graph of result of Tx mode Horizontal



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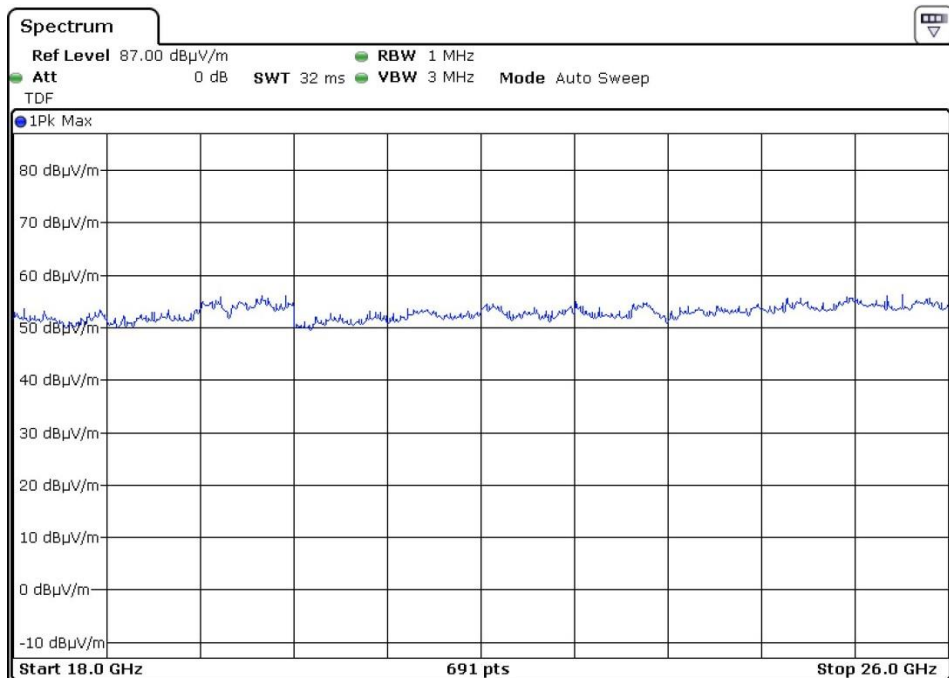
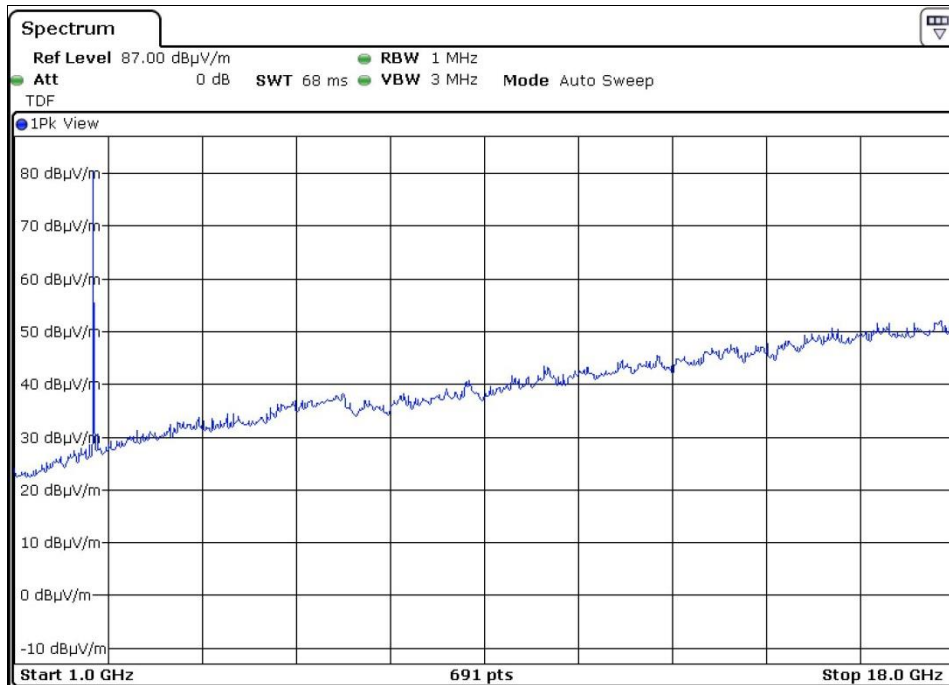


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Vertical



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Result of Tx mode (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2399.9	33.1	27.9	61.0	70.4	9.4	Vertical
4804.0	5.1	32.1	37.2	74.0	36.8	Vertical
7206.0	-3.0	38.6	35.6	74.0	38.4	Vertical
9608.0	-3.3	41.3	38.0	74.0	36.0	Vertical

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2399.9	22.0	27.9	49.9	56.2	6.3	Vertical
4804.0	-0.5	32.1	31.6	54.0	22.4	Vertical
7206.0	-5.9	38.6	32.7	54.0	21.3	Vertical
9608.0	-6.9	41.3	34.4	54.0	19.6	Vertical

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2399.9	32.8	27.9	60.7	70.4	9.7	Horizontal
4804.0	8.5	32.1	40.6	74.0	33.4	Horizontal
7206.0	-3.3	38.6	35.3	74.0	38.7	Horizontal
9608.0	-3.6	41.3	37.7	74.0	36.3	Horizontal

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2399.9	30.0	27.9	57.9	66.7	8.8	Horizontal
4804.0	1.3	32.1	33.4	54.0	20.6	Horizontal
7206.0	-5.2	38.6	33.4	54.0	20.6	Horizontal
9608.0	-6.3	41.3	35.0	54.0	19.0	Horizontal

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Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

* Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty	:	9kHz-30MHz	3.3dB
		30MHz -1GHz	4.6dB
		1GHz -26GHz	4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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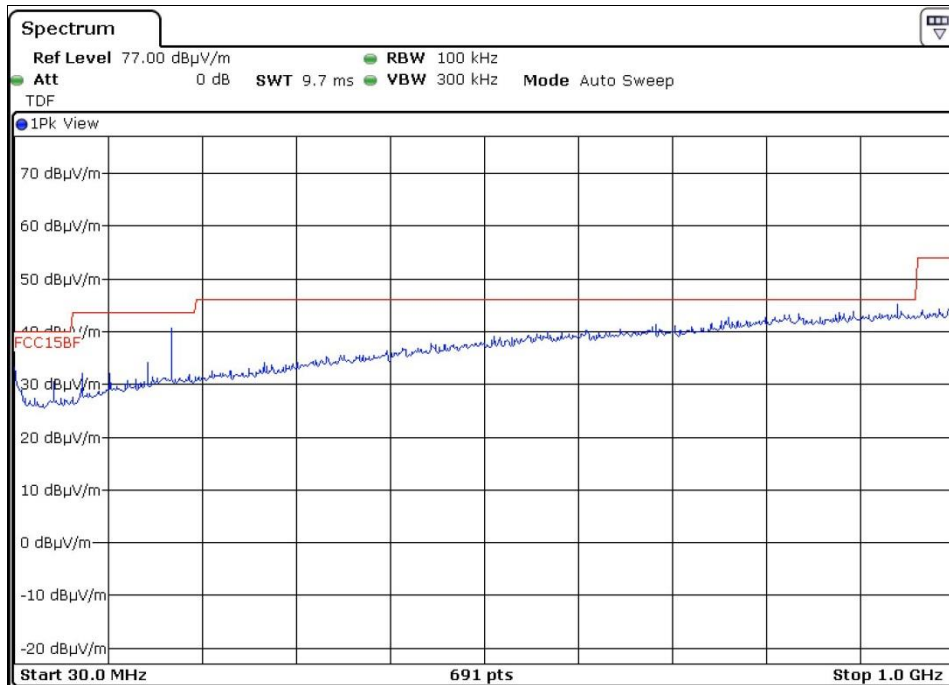
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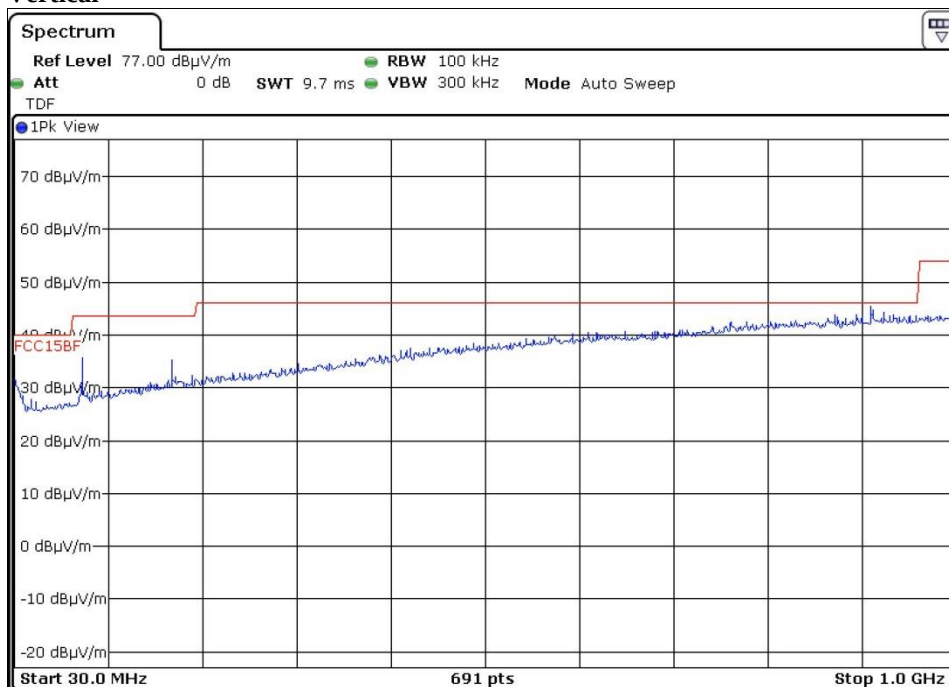
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Pre-scan result of Tx mode (30MHz – 1GHz):

Horizontal



Vertical



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Result of Tx mode (30MHz – 1GHz): PASS

Field Strength of Fundamental and Harmonics Emissions					
Quasi-Peak Value					
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	E-Field Polarity
71.4	21.2	7.3	28.5	40.0	Horizontal
100.9	21.7	8.3	30.0	43.5	Horizontal
129.0	22.4	7.6	30.0	43.5	Horizontal
168.3	22.0	10.0	32.0	43.5	Horizontal
192.1	28.4	10.3	38.7	43.5	Horizontal
940.3	18.2	25.0	43.2	46.0	Horizontal
47.5	17.2	7.5	24.7	40.0	Vertical
53.2	17.6	6.8	24.4	40.0	Vertical
100.9	23.4	8.3	31.7	43.5	Vertical
192.1	22.5	9.8	32.3	43.5	Vertical
213.20	18.5	10.8	29.3	43.5	Vertical
910.9	16.8	25.7	42.5	46.0	Vertical

Result of Tx mode (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the Limits						

Remarks:

The pre-scan results are for reference, the frequencies found will perform final measurement which shown on the table below the graphs, therefore, there may be some different in measured frequencies and field strength shown on the graph and the table.

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : (9kHz – 30MHz): 3.3dB
(30MHz – 18GHz): 4.6dB
(18GHz - 26GHz): 4.4dB

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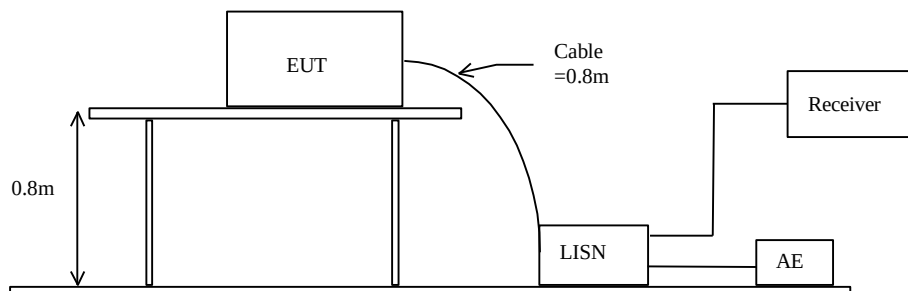
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207 Class B
Test Method:	ANSI C63.10: 2013
Test Date:	2020-09-12
Mode of Operation:	TX mode

Test Method:

The test was performed in accordance with ANSI C63.10: 2013, with the following: initial measurements were performed in peak and average detection modes on the live line, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:





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Limits for Conducted Emissions (FCC 47 CFR 15.207):

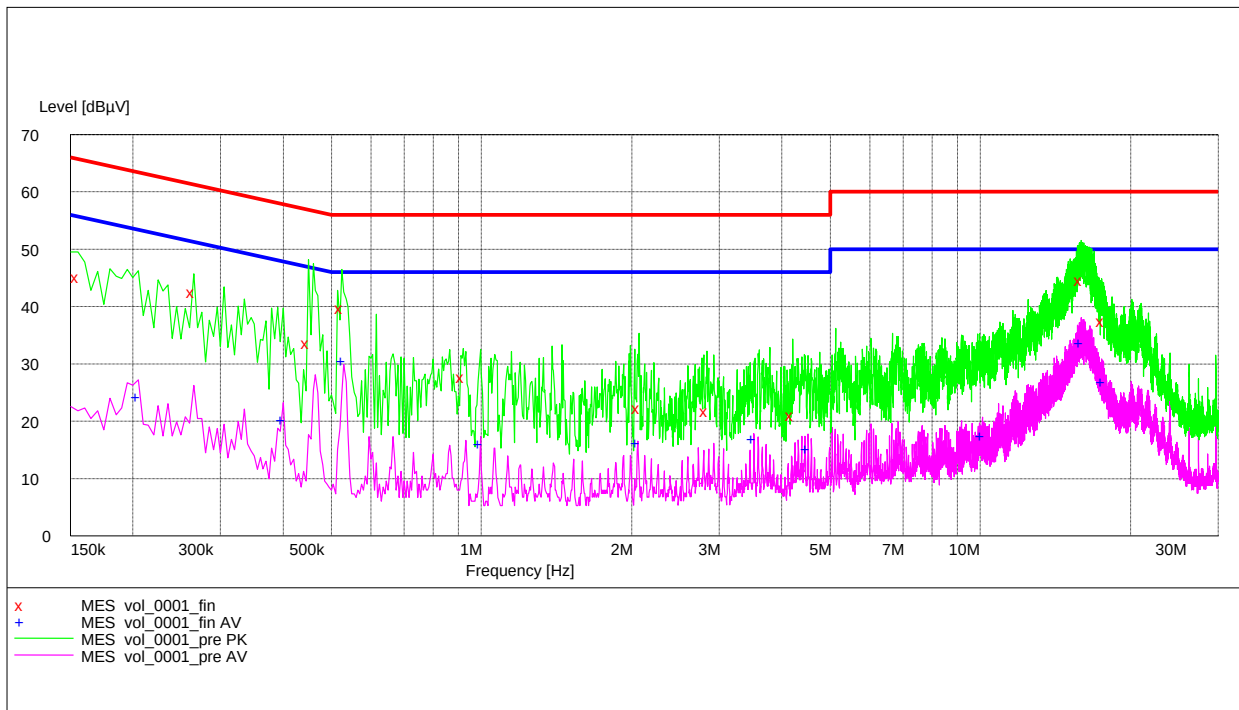
Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of TX mode (Live and Neutral): PASS

Please refer to the following diagram for individual results.



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MEASUREMENT RESULT: "vol_0001_fin QP"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.155000	45.20	9.9	66	20.5	N	GND
0.265000	42.70	9.9	61	18.5	L1	GND
0.450000	33.80	10.0	57	23.0	L1	GND
0.525000	39.90	10.0	56	16.1	N	GND
0.920000	27.80	10.0	56	28.2	L1	GND
2.070000	22.40	10.1	56	33.6	L1	GND
2.835000	21.90	10.1	56	34.1	L1	GND
4.210000	21.20	10.2	56	34.8	L1	GND
15.945000	44.70	10.6	60	15.3	N	GND
17.670000	37.60	10.3	60	22.4	N	GND

MEASUREMENT RESULT: "vol_0001_fin AV"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.205000	24.30	9.9	53	29.1	N	GND
0.400000	20.30	10.0	48	27.6	N	GND
0.530000	30.60	10.0	46	15.4	L1	GND
0.995000	16.20	10.0	46	29.8	N	GND
2.060000	16.30	10.1	46	29.7	L1	GND
3.520000	17.00	10.2	46	29.0	N	GND
4.520000	15.30	10.3	46	30.7	L1	GND
10.100000	17.60	10.4	50	32.4	N	GND
15.945000	33.70	10.6	50	16.3	N	GND
17.670000	27.00	10.3	50	23.0	N	GND

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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2020/04/13	2021/04/13
EM356	ANTENNA POSITIONING TOWER	ETS-LINDGREN	2171B	00150346	N/A	N/A
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2020/05/13	2021/05/13
EM022	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2019/11/30	2021/11/30
EM276	BROADBAND HORN ANTENNA	A-INFOMW	JXTXLB- 10180-SF	J203109090300 7	2019/03/15	2021/03/15
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2019/05/13	2021/05/13
EM354	BICONILOG ANTENNA	ETS-LINDGREN	3143B	142073	2020/06/17	2022/06/17

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM119	LISN	R & S	ESH3-Z5	0831.5518.52	2020/06/30	2021/06/30
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2020/05/13	2021/05/13
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357-8810.52/54	2020/01/13	2021/01/11

Support Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.
COMPUTER - THINKPAD X1 CARBON	LENOVO	TP00086A	SL10P98060
USB 5V ADAPTOR	APPLE	A1299	QU119D0PWT3DAG
USB TO MICRO CABLE (1M)	MOMAX	DM16	N/A

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

The Hong Kong Standards and Testing Centre Limited

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Test Report

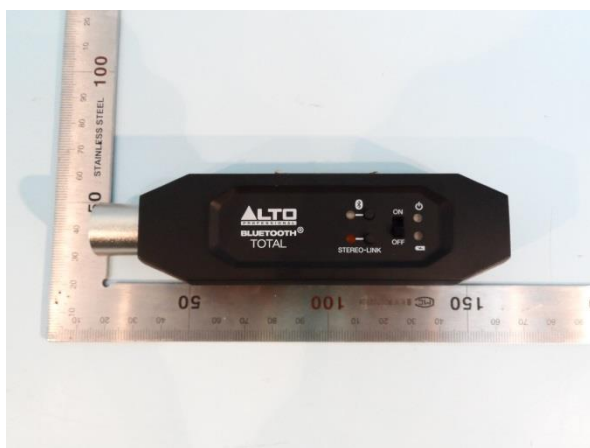
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Appendix B

Photographs of EUT

External View of the product



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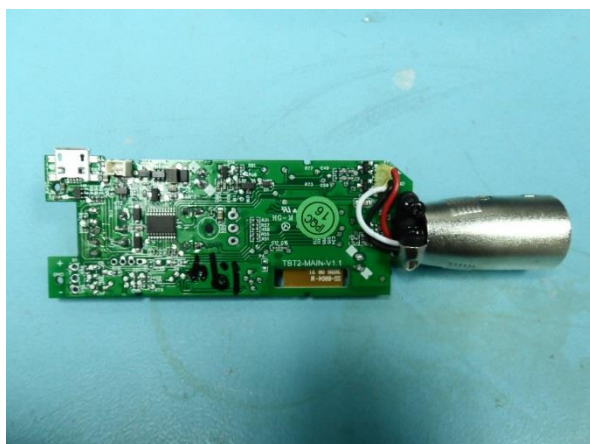
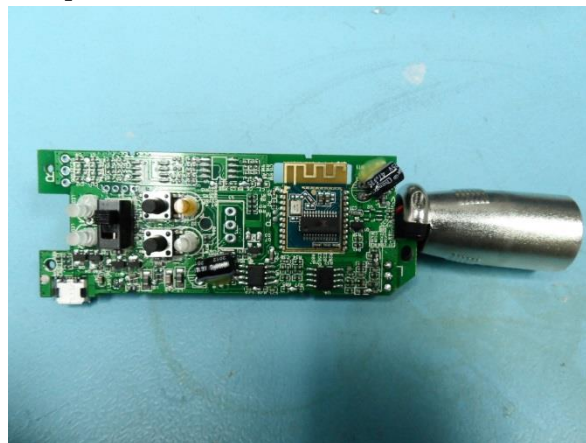
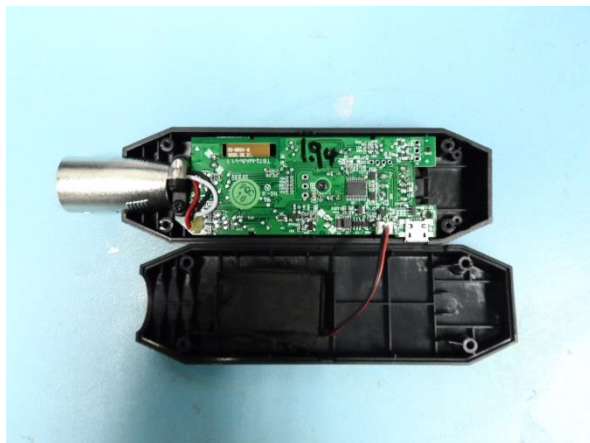
Test Report

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Photographs of EUT

Internal View of the product



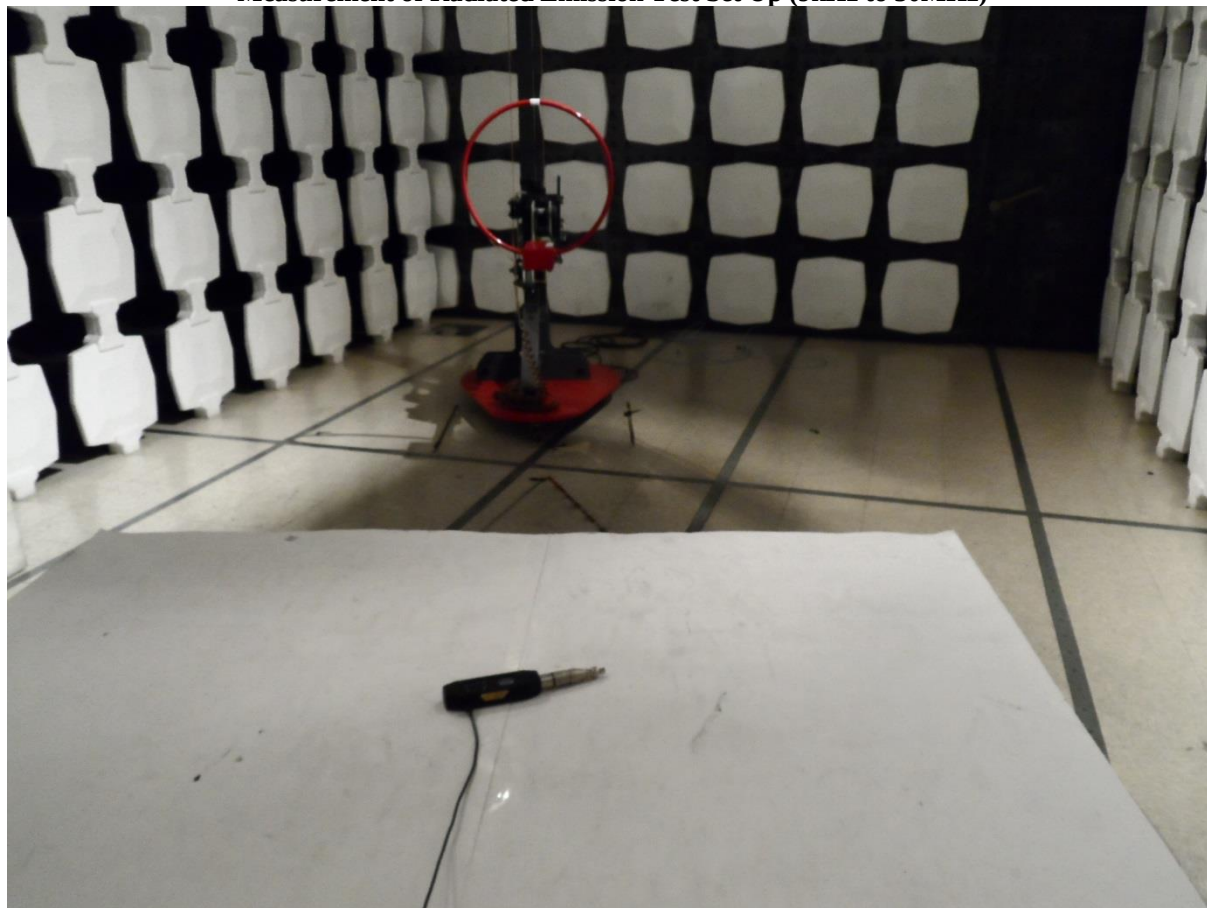
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Photographs of EUT

Measurement of Radiated Emission Test Set Up (9kHz to 30MHz)



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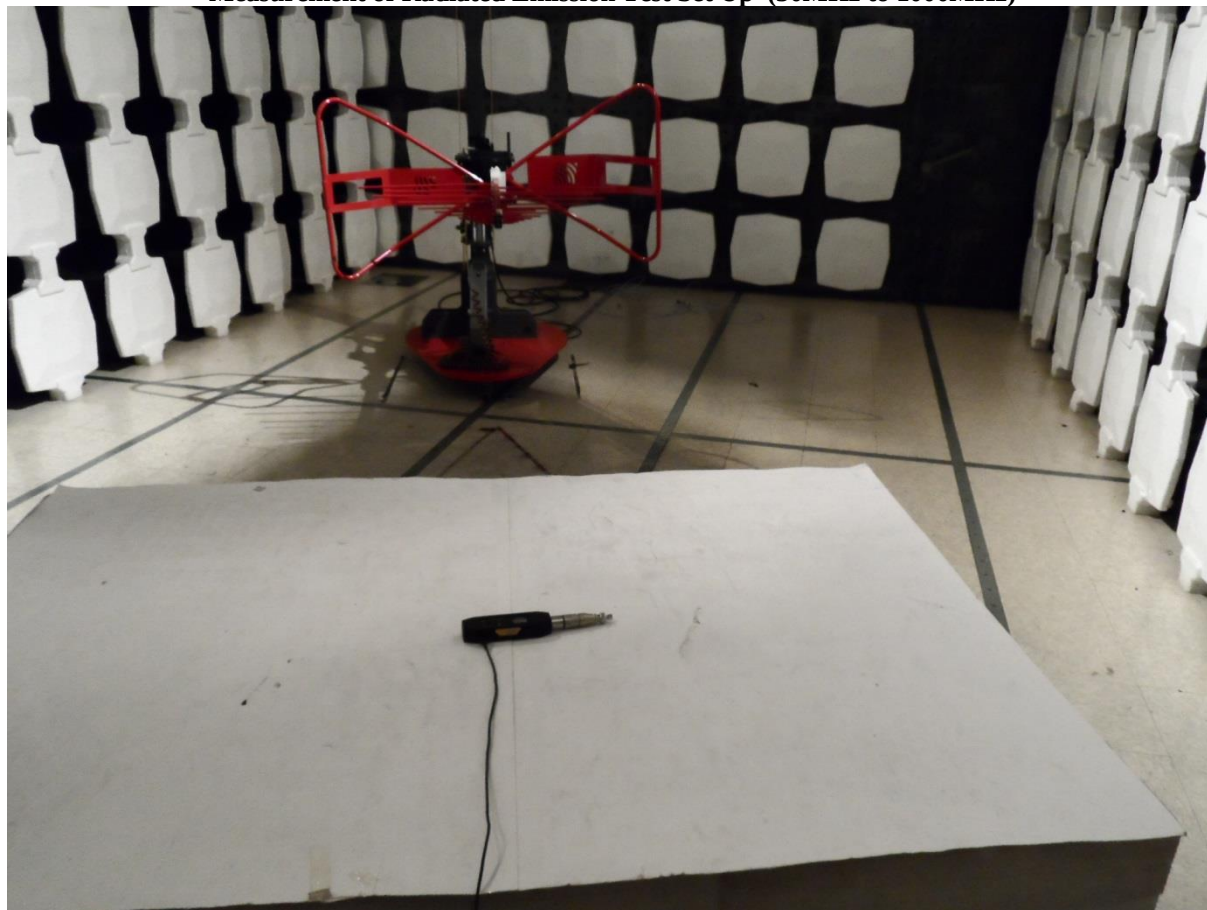
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Photographs of EUT

Measurement of Radiated Emission Test Set Up (30MHz to 1000MHz)



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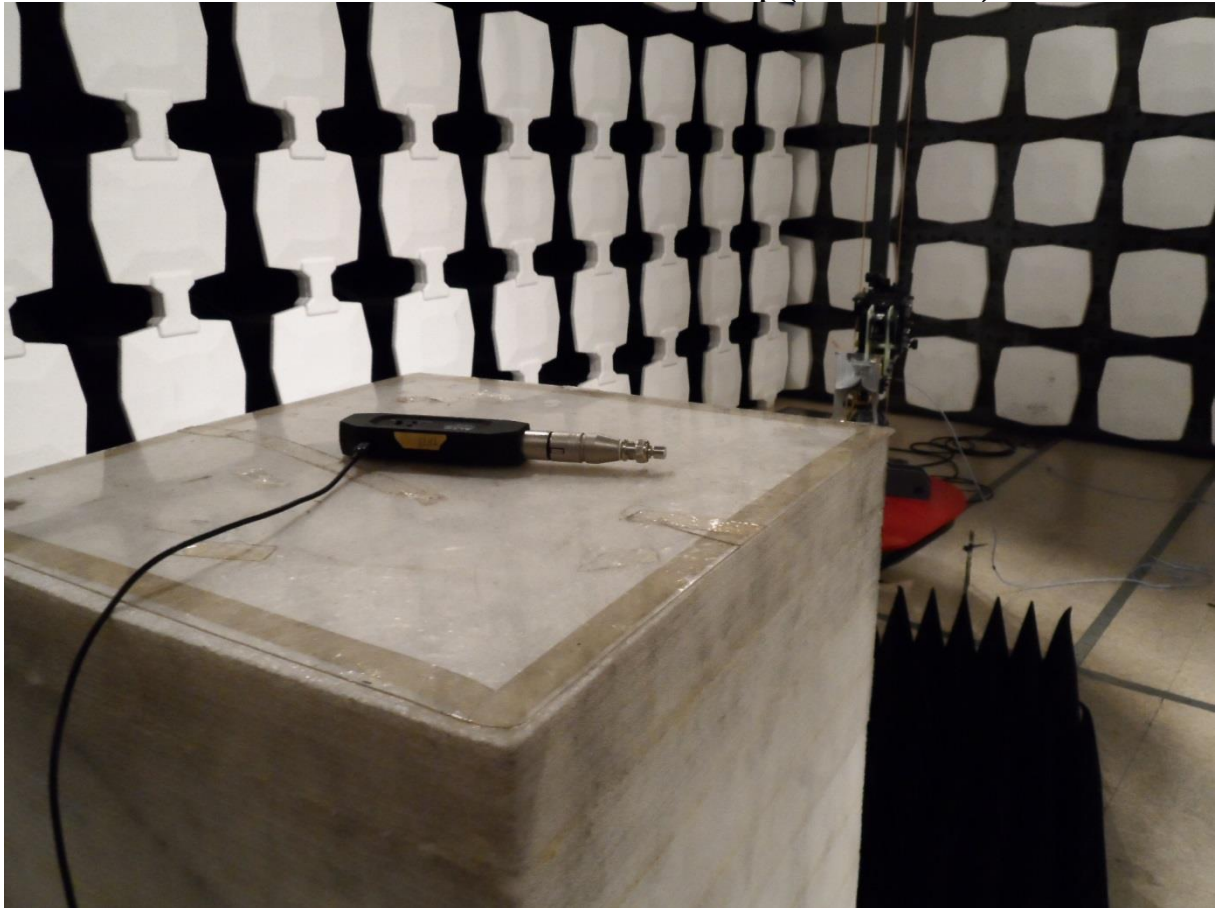
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Photographs of EUT

Measurement of Radiated Emission Test Set Up (above 1000MHz)



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Photographs of EUT

Measurement of Conducted Emission Test Set Up



***** End of Test Report *****

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