

FCC 15.225 13.56MHz Test Report

for

Elitegroup Computer Systems Co., Ltd.

**No. 239, Sec. 2., TiDing Blvd., Taipei,
Taiwan 11493**

Brand : ECS
Product Name : Personal Computer
Model Name : SKM-U mPC
Family Name : SKM-U mPC.....
(The dots "." in the model name can be 0 to 9, A to Z, a-z,
"-", "_", "\", "/" or blank, for marketing use only.)
FCC ID : WL6SKM-U-MPCH

Prepared by : AUDIX Technology Corporation,
EMC Department



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TEST REPORT CERTIFICATION

Applicant : Elitegroup Computer Systems Co., Ltd.
Product Name : Personal Computer
Model No. : SKM-U mPC
Family Name : SKM-U mPC.....
(The dots "." in the model name can be 0 to 9, A to Z, a-z, "-",
"_", "\", "/" or blank, for marketing use only.)
Serial No. : N/A
Brand : ECS
Power Supply : DC 19V

Applicable Standards:

47 CFR FCC Part 15 Subpart C:2015
ANSI C63.10:2013

AUDIX Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. AUDIX Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Test: 2016. 07. 24 ~ 09. 02

Date of Report: 2016. 09. 05

Producer: Sabrina Wang
(Sabrina Wang/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2016. 09. 05	Original Report.	EM-F160579

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	PASS
15.225(a)(b)(c)	In-Band Emission	PASS
15.225(d)/15.209	Out-of-Band Emission	PASS
15.215 (c)	20dB Bandwidth	PASS
15.225(e)	Frequency Stability Tolerance	PASS

3. GENERAL INFORMATION

3.1. Description of EUT

Product	Personal Computer
Model No.	SKM-U mPC
Family Name	SKM-U mPC..... (The dots "." in the model name can be 0 to 9, A to Z, a-z, "-", "_", "\", "/" or blank, for marketing use only.)
Serial Number	N/A
Brand	ECS
Applicant	Elitegroup Computer Systems Co., Ltd. No. 239, Sec. 2., TiDing Blvd., Taipei, Taiwan 11493
Power Supply Rating	Refer to AC adapter rating.
RF Features	NFC (Reader)
Antenna Type	Loop antenna
Date of Receipt of Sample	2016. 07. 05
I/O Ports List	Personal Computer • USB 3.1(Type A/BC1.2) Port *1 • USB 3.1(Type C) Port *1 • Combo Audio Jack *1 • DC Jack *1 • HDMI Port *1 • RJ45 Port *1 (10/100/1000Mbps) • USB 3.0 Ports *2 • DP Port *1 • Pogo Pin Port *1 COM Box • DC Jack *1 • USB 3.0 Ports *4 • DB-44/RS232 Port*1 • RS232 Port*1 • RS485 Port*1 • Pogo Pin Port *1 HDD Box • Micro USB 3.0 Port *1 • Pogo Pin Port *1

3.2. EUT Specifications Assessed in Current Report

Fundamental Range (MHz)	Channel Number	Modulation
13.56	1	ASK

3.3. Descriptions of Key Components and Operating Modes

3.3.1. For the All Component Lists

Item	Supplier	Description	Character
Main Board	ECS	SKM-U	---
Chassis	Hunt key	mPC_H_TO_BO_WC_SPK	Black
VESA Mount Bracket (Option)	ECS	---	HDD Box
	ECS	---	COM Box
CPU (BGA1356)	Intel	i7-6650U	2.2 GHz
	Intel	i5-6260U	1.8 GHz
	Intel	i3-6100U	2.3 GHz
	Intel	3955U	2.0 GHz
Memory	ADATA	H5AN4G6NAFR-TFC	DDR4-2133MHz (2GB)
	Transcend	TS512MSH64V1H	DDR4-2133MHz (4GB)
	Transcend	TS1GSH64V1H	DDR4-2133MHz (8GB)
HDD	WD	WD10JPVX-22JC3T0	2.5" 5400rpm 1000GB, SATA III
	Seagate	ST500LT012	2.5" 5400rpm 500GB, SATA III
SSD	Transcend	TS32GMTS800	32GB, SATA III
	Transcend	TS128GMTS800	128GB, SATA III
	Transcend	TS256GMTS800	256GB, SATA III
ANTENNA (L)	VSO	S11-Black	Main, PIFA Antenna Black Antenna
ANTENNA (R)	VSO	S22-Gray	AUX, PIFA Antenna Gray Antenna
WLAN Combo Module	Intel	3165NGW	802.11a/b/g/n/ac+BT4.2+BLE
Speaker (Option)	Yucheng	QT-6116AW-1-W	1W
Wireless Charger Card (Option)	ECS	WCPTI-S(1.0)	---
NFC Module (Option)	ASTAG	RFM-ECS-8640	---
AC Adapter	FSP GROUP INC.	FSP065-10AABA	I/P: 100-240Vac, 50-60Hz, 1.5A. O/P: 19Vdc, 3.43A, 65W max
		AC: Wall-mount, 2C DC Power Cord: Unshielded, Undetachable, 1.8m (Bonded one ferrite core)	
	Asian Power Devices Inc.	WA-65B19R	I/P: 100-240Vac, 50-60Hz, 1.5A. O/P: 19Vdc, 3.43A, 65W max
		AC: Wall-mount, 2C DC Power Cord: Unshielded, Undetachable, 1.8m (Bonded one ferrite core)	
	Asian Power Devices Inc.	DA-90F19	I/P: 100-240Vac, 50-60Hz, 1.5A Max. O/P: 19Vdc, 4.74A (90W)
		AC Power Cord: Unshielded, Undetachable, 1.8m (3C) DC Power Cord: Unshielded, Undetachable, 1.8m (Bonded one ferrite core)	

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

3.3.2. List of operating modes under test:

Item	Supplier	Model/Type	Description	Configuration Mode
Main Board	ECS	SKM-U	---	V
Chassis	Hunt key	mPC_H_TO_BO_WC_SPK	Black	V
CPU (BGA1356)	Intel	i7-6650U	2.2 GHz	V
Memory	ADATA	H5AN4G6NAFR-TFC	DDR4-2133MHz (2GB)	V
HDD	Seagate	ST500LT012	2.5" 5400rpm 500GB, SATA III	V
SSD	Transcend	TS32GMTS800	32GB, SATA III	V
ANTENNA (L)	VSO	S11-Black	Main, PIFA Antenna	V
ANTENNA (R)	VSO	S22-Gray	AUX, PIFA Antenna	V
WLAN Combo Module	Intel	3165NGW	802.11a/b/g/n/ac+BT4.2+BLE	V
NFC Module	ASTAG	RFM-ECS-8640	---	V
AC Adapter	Asian	FSP065-10AABA	19Vdc, 3.43A, 65W max	V

3.4. Tested Supporting System List

3.4.1. Support Peripheral Unit

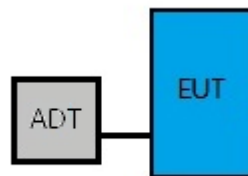
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Power Socket	N/A	N/A	N/A	N/A

3.4.2. Cable Lists

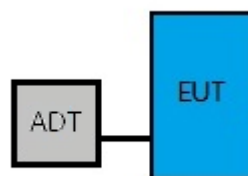
No.	Cable Description Of The Above Support Units
1.	Power Cord: Unshielded, Detachable, 1.8m

3.5. Setup Configuration

3.5.1. EUT Configuration for Power Line & Radiated Emission



3.5.2. EUT Configuration for Conducted Test Items



3.6. Operating Condition of EUT

To Set EUT on RF function under continues transmitting.

3.7. Description of Test Facility

Test Firm Name : **AUDIX Technology Corporation**
EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan

Test Location & Facility : **No. 7 Shielded Room &**
No. 1 Semi-Anechoic Chamber
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan

NVLAP Lab. Code : 200077-0

TAF Accreditation No : 1724

FCC OET Designation : TW1004 & TW1090

3.8. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	± 3.5dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark : Uncertainty = $k_{uc}(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz
Frequency Stability	±0.78ppm

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Test Receiver	R&S	ESCI	101276	2016. 03. 31	2017. 03. 30
2.	A.M.N.	R&S	ESH2-Z5	100366	2016. 03. 15	2017. 03. 14
3.	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	2016. 01. 17	2017. 01. 16
4.	Pulse Limiter	R&S	ESH3-Z2	101495	2016. 01. 17	2017. 01. 16
5.	Test Software	Audix	e3	V.6.120424	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

4.2.1. Frequency Range 9kHz~1000MHz (Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2015. 09. 14	2016. 09. 13
2.	Test Receiver	R & S	ESCS30	100338	2016. 06. 22	2017. 06. 21
3.	Loop Antenna	R&S	HFH2-Z2	891847/27	2015. 12. 24	2016. 12. 23
4.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.2.2. Frequency Range 30MHz~1000MHz (Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2015. 09. 14	2016. 09. 13
2.	Test Receiver	R & S	ESCS30	100338	2016. 06. 22	2017. 06. 21
3.	Amplifier	HP	8447D	2944A06305	2016. 02. 23	2017. 02. 22
4.	Bilog Antenna	CHASE	CBL6112D	33821	2016. 01. 30	2017. 01.29
5.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

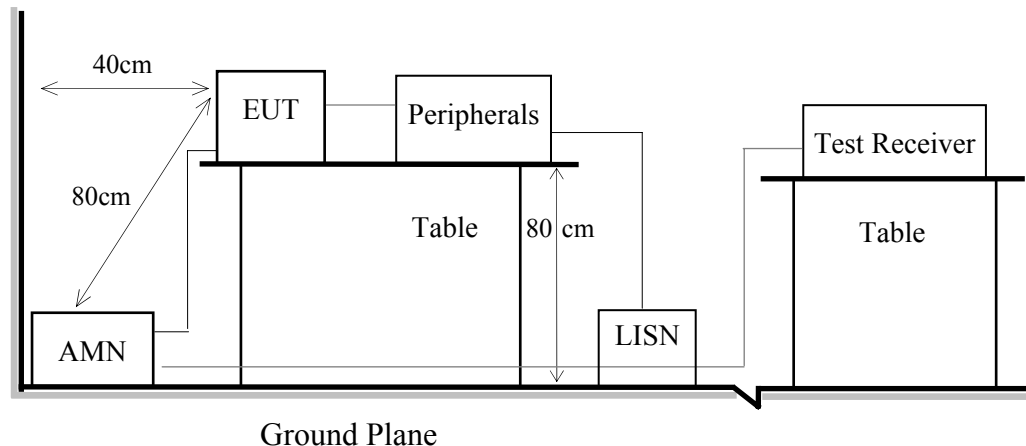
4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2016. 06. 07	2017. 06. 06
2.	Programmable Temperature & Humidity Chamber	GIANT	GTH-150-40-CP-AR	MAA1505-008	2016. 05. 11	2017. 05. 10
3.	Transformer	TAILI	TL-220	N/A	N.C.R.	N.C.R.

5. CONDUCTED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup

Shielded Room Setup Diagram



5.2. Power Line Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

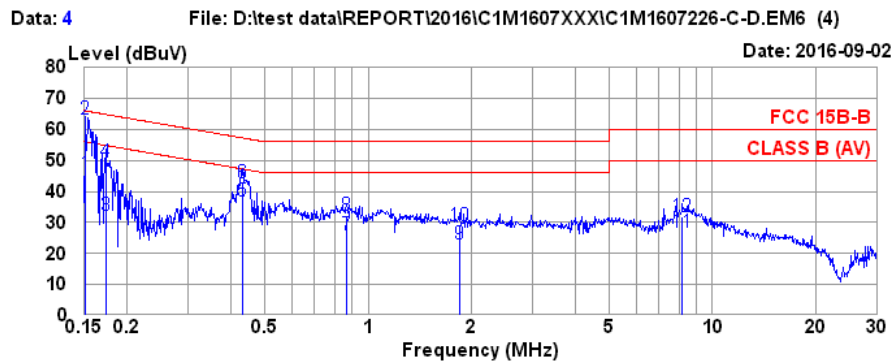
5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Conducted Emission Measurement Results

PASSED.

Test Date	2016/09/02	Temp./Hum.	26°C/60%
Test Voltage	DC 19V (Via AC Adaptor)		



Site no. : No.7 Shielded Room Data no. : 4
Condition : ESH3-Z5 861189/008 Phase : NEUTRAL
Limit : FCC 15B-B
Env. / Ins. : 26°C / 60% ESCI (1276) Engineer : Nick Du
EUT : SKU-M
Power Rating : DC 19V (via adapter)
Test Mode : Operating

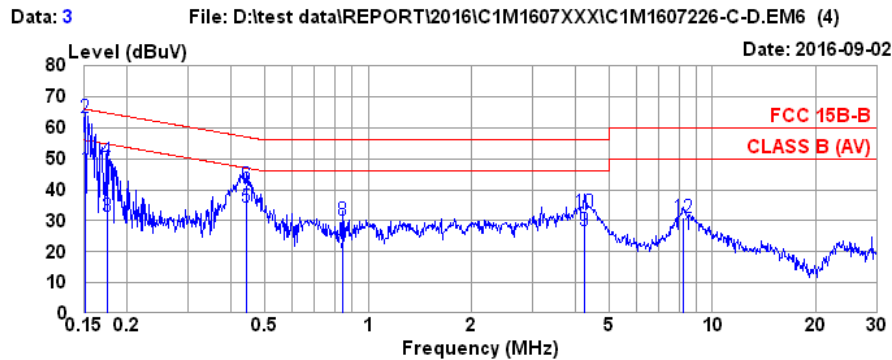
	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	0.10	0.03	9.85	35.76	45.74	55.91	10.17	Average
2	0.152	0.10	0.03	9.85	53.32	63.30	65.91	2.61	QP
3	0.173	0.11	0.03	9.85	22.17	32.16	54.81	22.65	Average
4	0.173	0.11	0.03	9.85	39.38	49.37	64.81	15.44	QP
5	0.431	0.13	0.04	9.85	26.70	36.72	47.24	10.52	Average
6	0.431	0.13	0.04	9.85	32.80	42.82	57.24	14.42	QP
7	0.866	0.17	0.06	9.89	15.85	25.97	46.00	20.03	Average
8	0.866	0.17	0.06	9.89	22.34	32.46	56.00	23.54	QP
9	1.839	0.19	0.07	9.95	12.84	23.05	46.00	22.95	Average
10	1.839	0.19	0.07	9.95	18.83	29.04	56.00	26.96	QP
11	8.192	0.47	0.16	9.87	16.45	26.95	50.00	23.05	Average
12	8.192	0.47	0.16	9.87	21.37	31.87	60.00	28.13	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

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Fax: +886 2 26099303

Test Date	2016/09/02	Temp./Hum.	26°C/60%
Test Voltage	DC 19V (Via AC Adaptor)		



Site no. : No.7 Shielded Room Data no. : 3
Condition : ESH3-Z5 861189/008 Phase : LINE
Limit : FCC 15B-B
Env. / Ins. : 26°C / 60% ESCI (1276) Engineer : Nick Du
EUT : SKU-M
Power Rating : DC 19V (via adapter)
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	0.16	0.03	9.85	36.28	46.32	55.91	9.59	Average
2	0.152	0.16	0.03	9.85	53.16	63.20	65.91	2.71	QP
3	0.175	0.15	0.04	9.85	21.35	31.39	54.72	23.33	Average
4	0.175	0.15	0.04	9.85	39.49	49.53	64.72	15.19	QP
5	0.442	0.16	0.04	9.85	24.39	34.44	47.02	12.58	Average
6	0.442	0.16	0.04	9.85	31.34	41.39	57.02	15.63	QP
7	0.844	0.16	0.06	9.89	9.73	19.84	46.00	26.16	Average
8	0.844	0.16	0.06	9.89	20.15	30.26	56.00	25.74	QP
9	4.247	0.33	0.11	9.88	16.70	27.02	46.00	18.98	Average
10	4.247	0.33	0.11	9.88	22.18	32.50	56.00	23.50	QP
11	8.235	0.56	0.16	9.87	14.87	25.46	50.00	24.54	Average
12	8.235	0.56	0.16	9.87	20.38	30.97	60.00	29.03	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

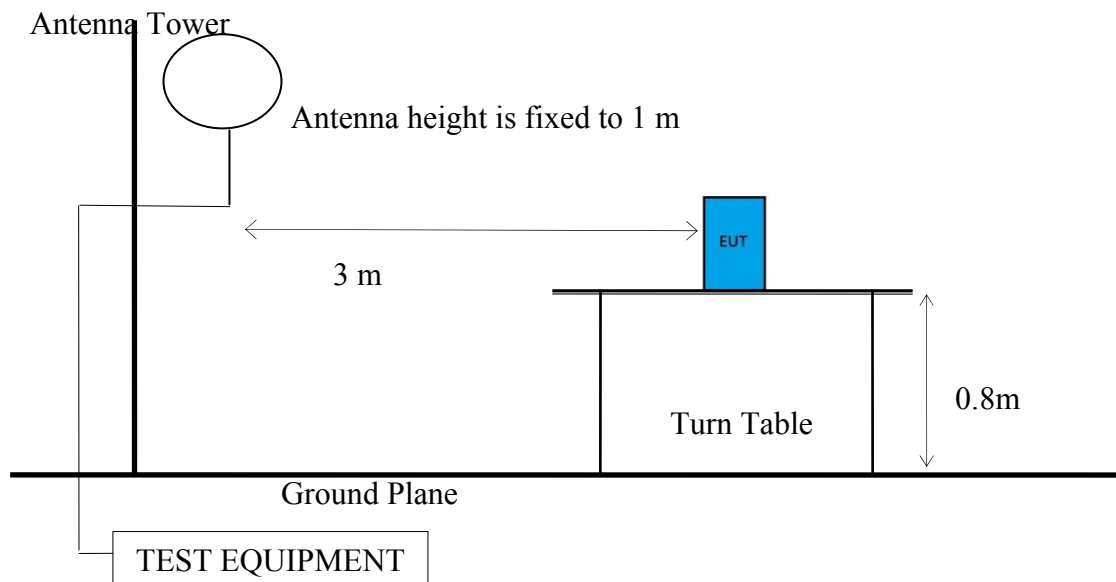
6. RADIATED SPURIOUS EMISSION MEASUREMENT (IN-BAND)

6.1. Block Diagram of Test Setup

6.1.1. Block Diagram of EUT

Indicated as section 3.5

6.1.2. Setup Diagram for 9kHz-30MHz



6.2. IN-Band Radiated Spurious Emission Limits

Frequency (MHz)	Distance (m)	Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
13.553-13.567	30	15848	84
	3	1584893	124
13.410 -13.553 and 13.567-13.710	30	334	50.50
	3	33381	90.50
13.110 -13.410 and 13.710-14.010	30	106	40.5
	3	10592	80.50

Remark : (1) $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

(2) $15848\mu\text{V/m} = 84\text{dB}\mu\text{V/m} = 84 + 40\log(30\text{m}/3\text{m}) = 124\text{dB}\mu\text{V/m}$

$334\mu\text{V/m} = 50.5\text{dB}\mu\text{V/m} = 50.5 + 40\log(30\text{m}/3\text{m}) = 90.5\text{dB}\mu\text{V/m}$

$106\mu\text{V/m} = 40.5\text{dB}\mu\text{V/m} = 40.5 + 40\log(30\text{m}/3\text{m}) = 80.5\text{dB}\mu\text{V/m}$

6.3. Test Procedure

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 2 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2013 regulation.

Below 30MHz:

(1) RBW = 9kHz with peak and average detector.

(2) Detector: average and peak (10kHz-490kHz)

Q.P. (490kHz-30MHz)

6.4. Test Results

PASSED.

Test Date	2016/08/03	Temp./Hum.	24°C/56%
Test Voltage	DC 19V (Via AC Adaptor)		

Antenna at 0 Degree

Test Frequency (MHz)	Test Result (dBμV/m at 3m)	Limits (dBμV/m at 3m)	Margin (dB)	Detector
13.560	41.50	123.99	82.49	Peak

Antenna at 90 Degree

Test Frequency (MHz)	Test Result (dBμV/m at 3m)	Limits (dBμV/m at 3m)	Margin (dB)	Detector
13.560	37.00	123.99	86.99	Peak

Note: All emissions are lower than the ambient level cannot be measured.

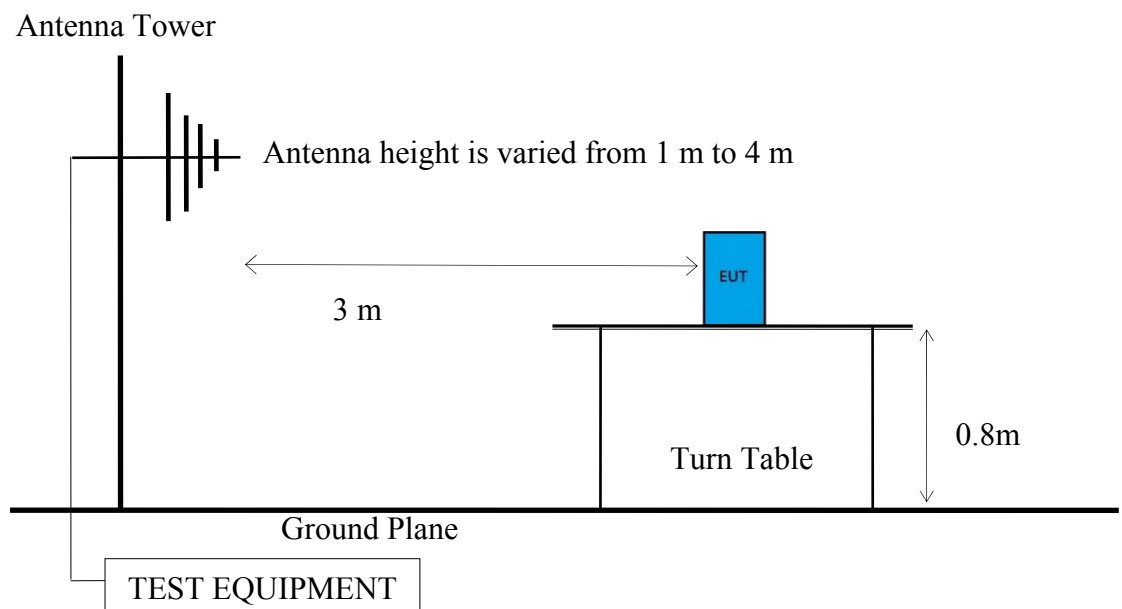
7. RADIATED SPURIOUS EMISSION MEASUREMENT (OUT-BAND)

7.1. Block Diagram of Test Setup

7.1.1. Block Diagram of EUT

Indicated as section 3.5

7.1.2. Setup Diagram for 30MHz-1000MHz



7.2. Out-Band Radiated Spurious Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
1.705 ~ 30	30 (3)	30 (2985)	29.54 (69.54)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

Remark : (1) $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

7.3. Test Procedure

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 regulation.

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.
- (7) When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

7.4. Measurement Result Explanation

■ Emission Level = Antenna Factor + Cable Loss + Meter Reading

7.5. Test Results

PASSED.

Test Date	2016/08/03	Temp./Hum.	24°C/56%
Test Voltage	DC 19V (Via AC Adaptor)		

7.5.1. Emissions within Restricted Frequency Bands

7.5.1.1. Frequency Range 9kHz~30MHz

Antenna at 0 Degree

Test Frequency (MHz)	Test Result (dBμV/m at 3m)	Limits (dBμV/m at 3m)	Margin (dB)	Detector
27.12	--- ^{Note}	69.54	---	Peak

Antenna at 90 Degree

Test Frequency (MHz)	Test Result (dBμV/m at 3m)	Limits (dBμV/m at 3m)	Margin (dB)	Detector
27.12	--- ^{Note}	69.54	---	Peak

Note: All emissions are lower than the ambient level cannot be measured.

7.5.1.2. Frequency Range 30MHz ~ 1000MHz

Antenna at Horizontal Polarization

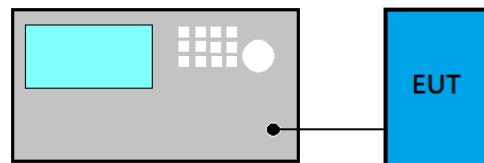
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
145.43	11.97	2.78	10.49	25.24	43.50	18.26	Peak
210.42	10.24	3.45	13.19	26.88	43.50	16.62	Peak
299.66	13.76	4.30	12.26	30.32	46.00	15.68	Peak
719.67	18.74	7.19	8.51	34.44	46.00	11.56	Peak
797.27	19.57	7.59	8.18	35.34	46.00	10.66	Peak
890.39	20.37	8.12	7.95	36.44	46.00	9.56	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
39.70	15.22	1.40	20.47	37.09	40.00	2.91	Peak
100.81	11.99	2.28	13.55	27.82	43.50	15.68	Peak
136.70	12.54	2.69	16.88	32.11	43.50	11.39	Peak
210.42	10.24	3.45	13.16	26.85	43.50	16.65	Peak
623.64	18.43	6.83	8.31	33.57	46.00	12.43	Peak
719.67	18.74	7.19	11.38	37.31	46.00	8.69	Peak

8. 20dB BANDWIDTH MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Specification Limits

The 20dB bandwidth shall be specified in operating frequency band.

8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r02:

■ Option 2

- (1) Set RBW = 1% of Span.
- (2) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

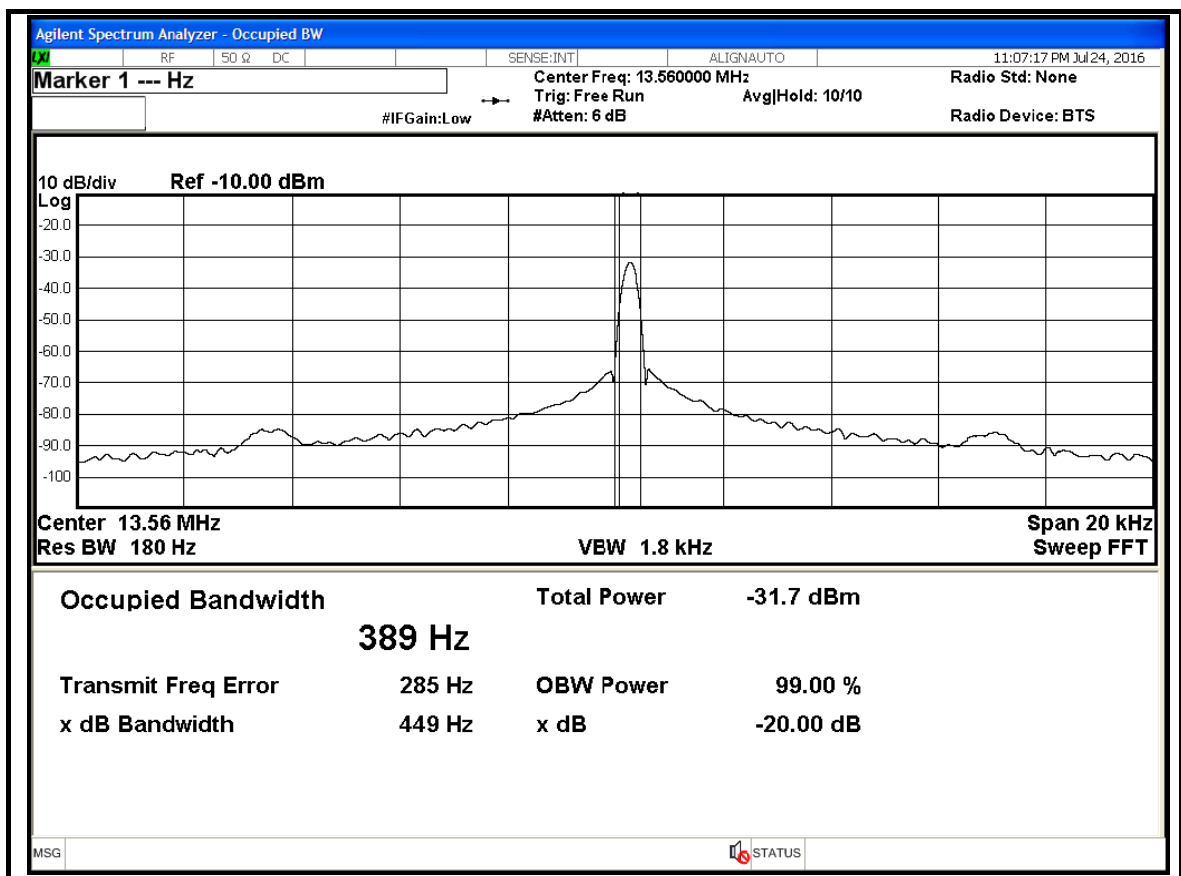
8.4. Test Results

Test Date	2016/07/24	Temp./Hum.	24°C/50%
Cable Loss	---	Test Voltage	DC 19V (Via AC Adaptor)

8.4.1. 20dB Bandwidth Result

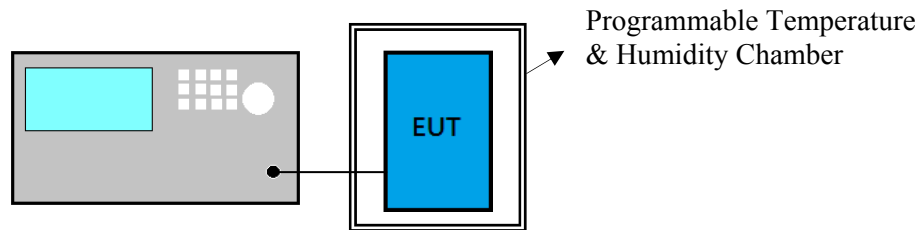
Centre Frequency (MHz)	20 dB Bandwidth (kHz)
13.56	0.449

8.4.2. Measurement Plots



9. FREQUENCY STABILITY MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. Specification Limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degree C.

9.3. Test Procedure

The device operating in the 13.553-13.567MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20 degrees to +50 degree C at normal supply voltage.

9.4. Test Results

Test Date	2016/07/24	Temp./Hum.	25°C/62%
Cable Loss	---	Test Voltage	DC 19V (Via AC Adaptor)

Test Mode: 2 Minute

Temperature(°C)	-20	-10	0	10	20
Voltage	AC 120V	AC 120V	AC 120V	AC 120V	AC 138V
Frequency(MHz)	13.55893	13.55882	13.55896	13.55925	13.56014
Error (%)	-0.00789	0.00870	-0.00767	-0.00553	0.00103

Temperature(°C)	20	30	40	50	20
Voltage	AC 102V	AC 120V	AC 120V	AC 120V	AC 120V
Frequency(MHz)	13.55989	13.56034	13.56052	13.56083	13.56009
Error (%)	-0.00081	0.00251	0.00383	0.00612	0.00066

Test Mode: 5 Minute

Temperature(°C)	-20	-10	0	10	20
Voltage	AC 120V	AC 120V	AC 120V	AC 120V	AC 138V
Frequency(MHz)	13.55901	13.55886	13.55921	13.55953	13.56025
Error (%)	-0.00730	-0.00841	-0.00583	-0.00347	0.00184

Temperature(°C)	20	30	40	50	20
Voltage	AC 102V	AC 120V	AC 120V	AC 120V	AC 120V
Frequency(MHz)	13.56007	13.56023	13.56029	13.56035	13.56013
Error (%)	0.00052	0.00170	0.00214	0.00258	0.00096

Test Mode: 10 Minute

Temperature(°C)	-20	-10	0	10	20
Voltage	AC 120V	AC 120V	AC 120V	AC 120V	AC 138V
Frequency(MHz)	13.55879	13.55887	13.55892	13.55896	13.55952
Error (%)	-0.00892	-0.00833	-0.00796	-0.00767	-0.00354

Temperature(°C)	20	30	40	50	20
Voltage	AC 102V	AC 120V	AC 120V	AC 120V	AC 120V
Frequency(MHz)	13.55984	13.56006	13.56017	13.56031	13.55989
Error (%)	-0.00118	0.00044	0.00125	0.00229	-0.00081

10. DEVIATION TO TEST SPECIFICATIONS

【NONE】