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TEST REPORT COVER PAGE

Product Information								
Product Name /	HANDHELD RADIO	Applicant Company Number:	109U					
Description:								
Model Number(s):	AAH56JDN9RA1AN	UPN Number:	89FT7066					
All Used IC Test Site(s)	2932I-1	SAR Test Lab Company						
Reg. #:		Number:						

		Em	issions I	nformation)			
	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6	Band 7	Band 8
RSS # & Issue #	RSS-247 & Issue 1				1			
Frequency Min (MHz)	2402							
Frequency Max (MHz)	2480	7.		70	10.70			
RF Power Min (W) Conducted / EIRP / ERP	-			1				
RF Power Max (W) Conducted	0.0026							
Field Strength Units @ distance	95.4 dBμV/m @ 3m	1	ш	. //				
Measured BW (kHz) (99%, 26dB, 6dB, etc.)	1040 (99%)			10.00				
Calculated BW (kHz) As per TRC-43	1200			70				
Emission Classification (FID, GID, DID, etc.)	1M20G1 D		0.0000					
Transmitter Spurious Units @ distance	14.9GHz 49.7 dBµV/m (Peak) @ 3m	1/2	Ü					
	В	В	В	В	В	В	В	В
RSS # & Issue #					7.1			
Frequency Min (MHz)				- 32				
Frequency Max (MHz)	202			72.0				
RF Power Min (W) Conducted / EIRP / ERP								
RF Power Max (W)								
Conducted / EIRP / ERP Field Strength Units @								
distance Measured BW (kHz)								
(99%, 26dB, 6dB, etc.) Calculated BW (kHz)								
As per TRC-43 Emission Classification								
(FID, GID, DID, etc.) Transmitter Spurious Units				1				
@ distance								
		Ag	reement	Signature				
ATTESTATION: The test me the radio equipment identified standards and all of the requ	ed in this appl	were made i ication has be	n accordance een subject	ce with the ab to all the appl				
Applicant / Agent Name:	Lim Che			Applicant / Ag	gent Title:	Assis	tant Vice Pres	sident
Applicant / Agent Signature:	7,11	M		Signature Da			ec 2015	

Motorola Solutions Malaysia Sdn Bhd Handheld Radio [Model : AAH56JDN9RA1AN] [FCC ID : AZ489FT7066 & IC : 109U-89FT7066]

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FORMAL REPORT ON TESTING IN ACCORDANCE WITH

47 CFR FCC Parts 15B & C RSS-GEN Issue 4: 2014 RSS-247 Issue 1: 2015 OF A

HANDHELD RADIO (BLUETOOTH LOW ENERGY)

[Model : AAH56JDN9RA1AN] [FCC ID : AZ489FT7066] [IC : 109U-89FT7066]

TEST FACILITY TÜV SÜD PSB Pte Ltd

Electrical & Electronics Centre (EEC), Product Services,

No. 1 Science Park Drive, Singapore 118221

FCC REG. NO. 99142 (3m and 10m Semi-Anechoic Chamber, Science Park)

IND. CANADA REG. NO. 2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)

PREPARED FOR Motorola Solutions Malaysia Sdn Bhd

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QUOTATION NUMBER 2191028611

JOB NUMBER 7191124732

TEST PERIOD 18 Aug 2015 – 22 Oct 2015

PREPARED BY

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TEST SUMMARY

The product was tested in accordance with the customer's specifications.

Test Results Summary

Test Standard	Description	Pass / Fail	
47 CFR FCC Part 15 and RS	S-GEN Issue 4: 2014 and RSS-247 Issue 1: 20	015	
15.207 RSS-GEN 8.8	Conducted Emissions	Not Applicable *See Note 4	
15.205, 15.209 RSS-GEN 8.9, 8.10	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass	
15.247(a)(2) RSS-247 5.2(1)	Spectrum Bandwidth (6dB & 99% Bandwidth Measurement)	Pass *See Note 11	
15.247(b)(3) RSS-247 5.4(4)	Maximum Peak Power	Pass	
15.247(d) RSS-247 5.5	RF Conducted Spurious Emissions (Non-Restricted Bands)	Pass *See Note 11	
15.247(d) RSS-247 5.5	RF Conducted Spurious Emissions (Restricted Bands)	Pass *See Note 11	
15.247(d) RSS-247 5.5	Band Edge Compliance (Conducted)	Pass *See Note 11	
15.247(d) RSS-247 5.5	Band Edge Compliance (Radiated)	Pass	
15.247(e) RSS-247 5.2(2)	Peak Power Spectral Density	Pass *See Note 11	



TEST SUMMARY

Notes

1. Three channels as listed below, which respectively represent the lower, middle and upper channels of the Equipment Under Test (EUT) were chosen and tested. For each channel, the EUT was configured to operate in the test mode.

Transmit Channel	Frequency (MHz)
Channel 0 (Lower Channel)	2402
Channel 19 (Middle Channel)	2440
Channel 39 (Upper Channel)	2480

- 2. The EUT is a Class B device when in non-transmitting state and meets the 47 CFR FCC Part15B Class B requirements.
- 3. All test measurement procedures are according to ANSI C63.4: 2014, ANSI C63.10: 2013 and KDB 558074 D01 DTS Measurement Guidance V03R03.
- 4. The Equipment Under Test (EUT) is a battery operated device / DC operated device and contains no provision for public utility connections. The Equipment Under Test (EUT) will be powered off and not operational during the charging mode.
- 5. The EUT was tested using fully charged batteries with DC voltage of 7.45V.
- 6. RSS-102 is RSS-102 Issue 4: 2015.
- 7. The unit was also investigated for inter-modulation products between the co-located Bluetooth and the land mobile radios. All inter-modulation products between the co-located radios were found to be compliant to the FCC limits of 15.209 and Industry Canada RSS-GEN.
- 8. The EUT uses a -4dBi internal PIFA which connects to the RF port via a spring contact. The EUT meets the requirement of FCC 15.203.
- 9. The maximum measured RF power of the Equipment Under Test is 4.15dBm.
- 10. All tests except Maximum Peak Power and Band Edge Compliance (Radiated) were tested at the maximum power of the RF module which is higher than the supported maximum EUT RF power. The Maximum Peak Power and Band Edge Compliance (Radiated) tests were tested at the maximum RF power of the EUT.
- 11. Conducted data reuse from FCC ID: AZ489FT7065 & IC: 109U-89FT7065 (7191121792-EEC15).

Modifications

No modifications were made.



PRODUCT DESCRIPTION

The Equipment Under Test (EUT) is a **HANDHELD RADIO**. Description

Manufacturer Motorola Solutions Malaysia Sdn Bhd

> Plot 2, Technoplex Industrial Park Mukim 12 Swd, Medan Bayan Lepas, Bayan Lepas Industrial Park,

11900 Bayan Lepas, Pulau Penang, Malaysia

Model Number AAH56JDN9RA1AN

FCC ID AZ489FT7066

IC 109U-89FT7066

Serial Number 871TRTT159 (RF Radiated Radio)

871TRP0174 (RF Conducted Radio)(Data from FCC ID: AZ489FT7065 &

IC: 109U-89FT7065)

Microprocessor Ti OMAPL138BZCEA3R

Operating / Transmitting Bluetooth / Bluetooth LE

Frequency 2.402GHz (lower channel) to 2.480GHz (upper channel)

79 channels (Bluetooth), 40 channels (Bluetooth LE)

WiFi

2.412GHz (lower channel) to 2.462GHz (upper channel)

11 channels

Land Mobile

136MHz to 174MHz / Channel Spacing 12.5kHz/25kHz

Clock / Oscillator Frequency Reference Clock: 38.4MHz, LO: 806MHz - 1054MHz

Modulation Bluetooth

Gaussian Frequency Shift Keying (GFSK)

(π/4) DQPSK **8DPSK**

WiFi

Differential Binary Phase Shift Keying (DBPSK) Differential Quadrature Phase Shift Keying (DQPSK)

Complementary Code Keying (CCK) Binary Phase Shift Keying (BPSK) Quadrature Phase Shift Keying (QPSK) 16-Quadrature Amplitude Modulation (16QAM) 64-Quadrature Amplitude Modulation (64QAM)

Land Mobile

Frequency Modulation (FM)

Antenna Gain : -4.0 dBi (PIFA Antenna)



PRODUCT DESCRIPTION

(Continued)

Port / Connectors : Refer to manufacturer's user manual / operating manual

Rated Input Power : 7.4Vdc 20.7Wh 2800mAh Lithium ION battery

Accessories : Refer to manufacturer's user manual / operating manual





SUPPORTING EQUIPMENT DESCRIPTION

Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
Fujitsu Laptop	M/N: S6310	Nil
	S/N: R7100269	
	FCC ID: DoC	
Fujitsu AC Adapter	M/N: CP293662-01	1.80m unshielded power cable
	S/N: O6X00399B	
	FCC ID: DoC	
Microsoft Wheel Mouse	M/N: X08-71118	Nil
	S/N: Nil	
	FCC ID: DoC	





EUT OPERATING CONDITIONS

47 CFR FCC Part 15 and RSS-GEN Issue 4 and RSS-247 Issue 1

- 1. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)
- 2. Spectrum Bandwidth (6dB Bandwidth Measurement)
- 3. Maximum Peak Power
- 4. RF Conducted Spurious Emissions (Non-Restricted Bands)
- 5. RF Conducted Spurious Emissions (Restricted Bands)
- 6. Band Edge Compliance (Conducted)
- 7. Band Edge Compliance (Radiated)
- 8. Peak Power Spectral Density

The EUT was exercised by operating in maximum continuous transmission in test mode, i.e transmitting at lower, middle and upper channels respectively at one time.





RADIATED EMISSION TEST

47 CFR FCC Part 15.205 and RSS-GEN 8.10 Restricted Bands

N	ИHz			MHz			MHz			GHz	
0.090	-	0.110	16.42	-	16.423	399.9	-	410	4.5	-	5.15
0.495	-	0.505	16.69475	-	16.69525	608	-	614	5.35	-	5.46
2.1735	-	2.1905	16.80425	-	16.80475	960	-	1240	7.25	-	7.75
4.125	-	4.128	25.5	-	25.67	1300	-	1427	8.025	-	8.5
4.17725	-	4.17775	37.5	-	38.25	1435	-	1626.5	9.0	-	9.2
4.20725	-	4.20775	73	-	74.6	1645.5	-	1646.5	9.3	-	9.5
6.215	-	6.218	74.8	-	75.2	1660	-	1710	10.6	-	12.7
6.26775	-	6.26825	108	-	121.94	1718.8	-	1722.2	13.25	-	13.4
6.31175	-	6.31225	123	-	138	2200	-	2300	14.47	-	14.5
8.291	-	8.294	149.9	_	150.05	2310	-	2390	15.35	-	16.2
8.362	-	8.366	156.52475	/-	156.52525	2483.5	h	2500	17.7	-	21.4
8.37625	-	8.38675	156.7	-	156.9	2690	2	2900	22.01	-	23.12
8.41425	-	8.41475	162.0125	-	167.17	3260	1	3267	23.6	-	24.0
12.29	-	12.293	167.72	-	173.2	3332	- 1	3339	31.2	-	31.8
12.51975	-	12.52025	240	- /	285	3345.8	-	3358	36.43	-	36.5
12.57675	-	12.57725	322	15/	335.4	3600	-	4400	Ab	ove 38	3.6
13.36	-	13.41									

47 CFR FCC Part 15.209 and RSS-GEN 8.9 Radiated Emission Limits

Frequency Range (MHz)	Quasi-Peak Limit Values (dBµV/m)
0.009 - 0.490	20 log [2400 / F (kHz)] @ 300m
0.490 - 1.705	20 log [24000 / F (kHz)] @ 30m
1.705 - 30.0	30.0 @ 30m
30 - 88	40.0 @ 3m
88 - 216	43.5 @ 3m
216 - 960	46.0 @ 3m
Above 960	54.0* @ 3m
* For from the male Old I - 0011 I - 44011 I -	1001-11

^{*} For frequency bands 9kHz – 90kHz, 110kHz – 490kHz and above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.

47 CFR FCC Part 15.209, RSS-GEN 8.9 and 8.10 Radiated Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
R&S Test Receiver – ESI1	ESI40	100010	14 Jul 2016	1 year
Schaffner Bilog Antenna –(30MHz-2GHz)	CBL6112D	2549	29 Jan 2016	1 year
BL3 (Ref)				
ETS Horn Antenna(18GHz-40GHz)(Ref)	3116	0004-2474	02 Oct 2016	1 year
EMCO Horn Antenna(1GHz-18GHz)	3115	0003-6088	20 Apr 2016	1 year
R&S Preamplifier (1GHz -18GHz)	SCU18	102191	13 Mar 2016	1 year
Agilent Preamplifier(1GHz-26.5GHz) (PA18)	8449D	3008A02305	06 Oct 2016	1 year
Com-Power Preamplifier (1MHz-1GHz)	PAM-103	441096	13 Oct 2016	1 year
Micro-Tronics Bandstop Filter (2.4-2.5 GHz)	BRM50701	017	13 Aug 2016	1 year



RADIATED EMISSION TEST

47 CFR FCC Part 15.209, RSS-GEN 8.9 and 8.10 Radiated Emission Test Setup

- 1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
- The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
- The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

47 CFR FCC Part 15.209, RSS-GEN 8.9 and 8.10 Radiated Emission Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition.
- 2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
- 3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
 - and adjusting the antenna height in the following manner:

 a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
 - b. The EUT was then rotated to the direction that gave the maximum emission.
 - Finally, the antenna height was adjusted to the height that gave the maximum emission.
- 4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point in the range of 9kHz 90kHz, 110kHz 490kHz and above 1GHz, both Peak and Average measurements were carried out.
- 5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
- 6. The frequency range covered was from the lowest radio frequency signal generated from the EUT, without going below 9kHz to 10th harmonics of the EUT fundamental frequency, using the loop antenna for frequency below 30MHz, Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

Sample Calculation Example

At 300 MHz Q-P limit = $46.0 \text{ dB}_{\mu}\text{V/m}$

Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB

Q-P reading obtained directly from EMI Receiver = 40.0 dBuV/m

(Calibrated level including antenna factors & cable losses)

Therefore, Q-P margin = 46.0 - 40.0 = 6.0

i.e. 6.0 dB below Q-P limit



RADIATED EMISSION TEST

47 CFR FCC Part 15.205, 15.209, RSS-GEN 8.9 and 8.10 Radiated Emission Results

Test Input Power	7.4Vdc	Temperature	22°C
Test Distance	3m (≥30MHz – 25GHz)	Relative Humidity	55%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBμV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Channel
33.0100	18.8	40.0	21.2	100	73	V	0
90.8630	24.9	43.5	18.6	100	108	V	0
198.8460	27.7	43.5	15.8	100	309	Н	0
226.3330	30.5	46.0	15.5	100	268	Н	0
655.7830	30.8	46.0	15.2	100	243	Н	0
885.2320	30.8	46.0	15.2	100	226	Н	0

Spurious Emissions above 1GHz - 25GHz

Freq (GHz)	Peak Value (dBμV/m)	Peak Limit (dB _µ V/m)	Peak Margin (dB)	AV Value (dBμV/m) *See Note 4	AV Limit (dΒμV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0810	44.7	74.0	29.3		54.0	9.3	400	45	Н	0
1.1619	47.0	74.0	27.0	1	54.0	7.0	100	66	Н	0
1.4655	47.4	74.0	26.6	7	54.0	6.6	200	267	V	0
1.5364	47.0	74.0	27.0		54.0	7.0	200	359	V	0
1.6882	46.8	74.0	27.2	- 61	54.0	7.2	200	351	V	0
1.9918	44.4	74.0	29.6	į.	54.0	9.6	100	288	V	0

Spurious Emissions above 1GHz - 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dΒμV/m)	Peak Margin (dB)	AV Value (dBμV/m) *See Note 4	AV Limit (dΒμV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0911	46.0	74.0	28.0		54.0	8.0	300	38	V	19
1.1619	47.6	74.0	26.4		54.0	6.4	100	52	Н	19
1.4757	47.4	74.0	26.6		54.0	6.6	200	273	V	19
1.6679	47.9	74.0	26.1		54.0	6.1	200	332	V	19
3.6009	45.0	74.0	29.0		54.0	9.0	200	14	V	19
14.2095	47.7	74.0	26.3		54.0	6.3	100	187	V	19



RADIATED EMISSION TEST

47 CFR FCC Part 15.205, 15.209, RSS-GEN 8.9 and 8.10 Radiated Emission Results

Spurious Emissions above 1GHz - 25GHz

Freq (GHz)	Peak Value (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	AV Value (dBμV/m) *See Note4	AV Limit (dΒμV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0911	49.0	74.0	25.0		54.0	5.0	300	41	V	39
1.1518	48.1	74.0	25.9		54.0	5.9	200	201	V	39
1.4655	46.9	74.0	27.1		54.0	7.1	200	217	٧	39
1.5364	47.3	74.0	26.7		54.0	6.7	300	276	V	39
1.6781	48.2	74.0	25.8		54.0	5.8	200	0	V	39
14.8896	49.7	74.0	24.3		54.0	4.3	100	329	V	39

Notes

- 1. All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- 2. Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by averaging over a complete cycle of the pulse train, including the blanking interval as the pulse train duration does not exceed 0.1 second.
- 3. A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- 4. As the measured peak shows compliance to the average limits, as such no average measurements was carried out. The EUT is deemed to meet both requirements.
- 5. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:

<u>30MHz - 1GHz</u>

RBW: 100kHz VBW: 1MHz

>1GHz

RBW: 1MHz VBW: 3MHz

- 6. The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
- 7. The upper frequency of radiated emission investigations was according to requirements stated in RSS-GEN 6.13.
- 8. The channel in the table refers to the transmit channel of the EUT.
- 9. Radiated Emissions Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz - 25GHz is $\pm 4.0dB$.



SPECTRUM BANDWIDTH (6dB and 99% BANDWIDTH MEASUREMENT) TEST

47 CFR FCC Part 15.247(a)(2) and RSS-247 5.2(1) Spectrum Bandwidth (6dB and 99% Bandwidth Measurement) Limits

The EUT shows compliance to the requirements of this section, which states that the minimum bandwidth of the EUT employing digital modulation techniques shall be at least 500kHz.

47 CFR FCC Part 15.247(a)(2) and RSS-247 5.2(1) Spectrum Bandwidth (6dB and 99% Bandwidth Measurement) Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
Agilent Spectrum Analyzer	E4404B	US39440632	02 Apr 2016	1 year

47 CFR FCC Part 15.247(a)(2) and RSS-247 5.2(1) Spectrum Bandwidth (6dB and 99% Bandwidth Measurement) Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- 2. The power supply for the EUT was connected to a filtered mains.
- 3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
- 4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to the following:

RBW = 100kHz

VBW = 3 times RBW

5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(a)(2) and RSS-247 5.2(1) Spectrum Bandwidth (6dB and 99% Bandwidth Measurement) Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode at lower channel.
- 2. The center frequency of the spectrum analyser was set to the transmitting frequency with the frequency span wide enough to capture the 6dB and 99% bandwidth of the transmitting frequency.
- 3. The spectrum analyser was set to max hold to capture the transmitting frequency. The signal capturing was continuous until no further changes were observed.
- 4. The peak of the transmitting frequency was detected with the marker peak function of the spectrum analyser. For 6dB bandwidth measurement, the frequencies below the 6dB peak frequency at lower (f_L) and upper (f_H) sides of the transmitting frequency were marked and measured by using the marker-delta function of the spectrum analyser. For 99% bandwidth measurement, the spectrum analyser power measurement was activated with bandwidth measurement as 99%.
- 5. For 6dB bandwidth measurement, the 6dB bandwidth of the transmitting frequency is the frequency difference between the marked lower and upper frequencies, $|f_H f_L|$. For 99% bandwidth measurement, the measured 99% bandwidth shown on the spectrum analyser was recorded.
- 6. The steps 2 to 5 were repeated with the transmitting frequency was set to middle and upper channel respectively.



SPECTRUM BANDWIDTH (6dB and 99% BANDWIDTH MEASUREMENT) TEST

47 CFR FCC Part 15.247(a)(2) and RSS-247 5.2(1) Spectrum Bandwidth (6dB and 99% Bandwidth Measurement) Results

Test Input Power	7.4Vdc	Temperature	24°C
Attached Plots	1 – 3 (20dB Bandwidth) 4 – 6 (99% Bandwidth)	Relative Humidity	56%
		Atmospheric Pressure	1030mbar
		Tested By	Liau Lee Yin

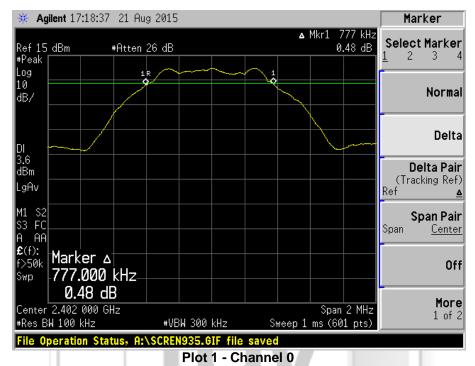
Channel	Channel Frequency (GHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	
0	2.402	0.777	1.015	
19	2.440	0.770	1.040	
39	39 2.480		1.020	





SPECTRUM BANDWIDTH (6dB and 99% BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (6dB Bandwidth Measurement) Plots



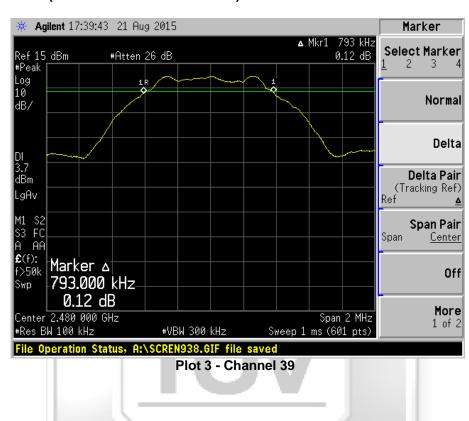
* Agilent 17:22:00 21 Aug 2015 Marker ▲ Mkr1 770 kHz 0.40 dB Ref 15 dBm #Peak Select Marker #Atten 26 dB Log 10 Normal dB/ Delta DI 3.7 dBm Delta Pair (Tracking Ref) LgAv Δ M1 S2 S3 FC Span Pair Center ΑA **£**(f): Marker 🛆 Off 770.000 kHz 0.40 dB More Center 2.440 000 GHz Span 2 MHz 1 of 2 #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (601 pts)

Plot 2 - Channel 19



SPECTRUM BANDWIDTH (6dB and 99% BANDWIDTH MEASUREMENT) TEST

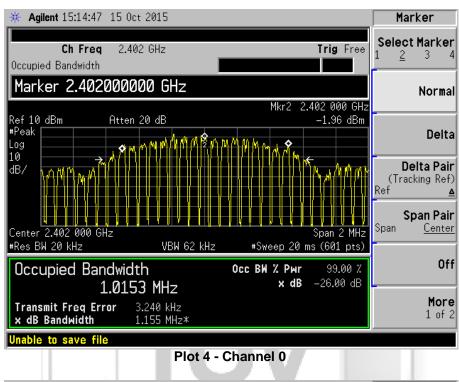
Spectrum Bandwidth (6dB Bandwidth Measurement) Plots





SPECTRUM BANDWIDTH (6dB and 99% BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (99% Bandwidth Measurement) Plots



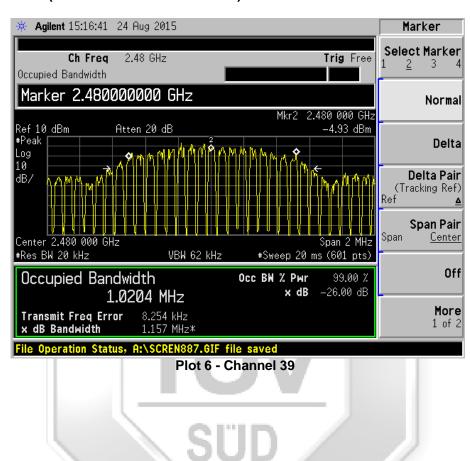
* Agilent 15:16:11 24 Aug 2015 Marker Select Marker Ch Frea 2.44 GHz Trig Free Occupied Bandwidth Marker 2.440000000 GHz Normal Mkr2 2.440 000 GHz Ref 10 dBm Atten 20 dB 0.70 dBm #Peak Delta 10 Delta Pair dB/ (Tracking Ref) Span Pair Span <u>Center</u> Center 2.440 000 GHz Span 2 MHz #Res BW 20 kHz VBW 62 kHz #Sweep 20 ms (601 pts) Off Occupied Bandwidth Occ BW % Pwr 99.00 % x dB -26.00 dB 1.0401 MHz More Transmit Freq Error 13.444 kHz 1 of 2 x dB Bandwidth 1.261 MHz* 1886.GIF file saved

Plot 5 - Channel 19



SPECTRUM BANDWIDTH (6dB and 99% BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (99% Bandwidth Measurement) Plots





MAXIMUM PEAK POWER TEST

47 CFR FCC Part 15.247(b)(3) and RSS-247 5.4(4) Maximum Peak Power Limits

The EUT shows compliance to the requirements of this section, which states the maximum peak power of the EUT employing digital modulation shall not exceed 1W (30dBm).

47 CFR FCC Part 15.247(b)(3) and RSS-247 5.4(4) Maximum Peak Power Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
Boonton Electronics RF Power Meter	4532	72901	27 Aug 2016	1 year
Boonton Electronics Peak Power Sensor	56218-S/1	1417	27 Aug 2016	1 year

47 CFR FCC Part 15.247(b)(3) and RSS-247 5.4(4) Maximum Peak Power Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- 2. The power supply for the EUT was connected to a filtered mains.
- 3. The RF antenna connector was connected to the power meter.
- 4. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(b)(3) and RSS-247 5.4(4) Maximum Peak Power Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode at lower channel.
- 2. The maximum peak power of the transmitting frequency was detected and recorded.
- 3. The e.i.r.p was computed by adding the antenna gain of the EUT (in dBi) to the measured peak power (in dBm).
- 4. The steps 2 to 4 were repeated with the transmitting frequency was set to middle and upper channel respectively.



MAXIMUM PEAK POWER TEST

47 CFR FCC Part 15.247(b)(3) and RSS-247 5.4(4) Maximum Peak Power Results

Test Input Power	7.4Vdc	Temperature	24°C
Antenna Gain	-4.0 dBi	Relative Humidity	56%
		Atmospheric Pressure	1030mbar
		Tested By	Liau Lee Yin

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Limit (W)
0	2.402	0.0026	1.0
19	2.440	0.0025	1.0
39	2.480	0.0026	1.0

Notes

1. Nil.





RF CONDUCTED SPURIOUS EMISSIONS (NON-RESTRICTED BANDS) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Non-Restricted Bands) <u>Limits</u>

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Non-Restricted Bands) Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
Agilent Spectrum Analyzer	E7405A	MY45106084	31 Jul 2016	1 year

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Non-Restricted Bands) Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- 2. The power supply for the EUT was connected to a filtered mains.
- The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
- 4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
- 5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Non-Restricted Bands) Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, with the transmitting frequency was set to lower channel.
- 2. The start and stop frequencies of the spectrum analyser were set to 30MHz and 10GHz.
- 3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
- 4. The steps 2 to 3 were repeated with frequency span was set from 10GHz to 25GHz.
- 5. The steps 2 to 4 were repeated with the transmitting frequency was set to middle and upper channel respectively.



RF CONDUCTED SPURIOUS EMISSIONS (NON-RESTRICTED BANDS) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Non-Restricted Bands) Results

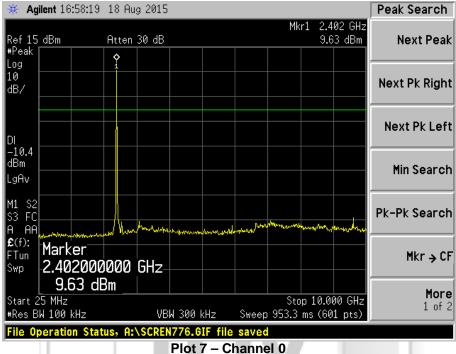
Test Input Power	7.4Vdc	Temperature	24°C
Attached Plots	7 – 12	Relative Humidity	56%
		Atmospheric Pressure	1030mbar
		Tested By	Liau Lee Yin

All spurious signals found were below the specified limit. Please refer to the attached plots.

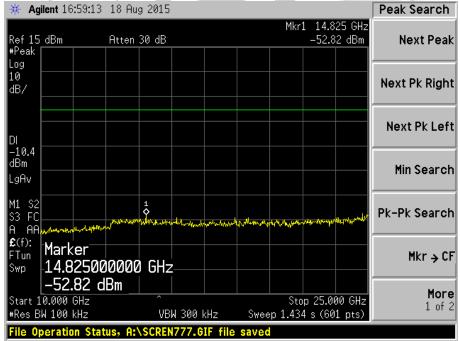




RF CONDUCTED SPURIOUS EMISSIONS (NON-RESTRICTED BANDS) TEST



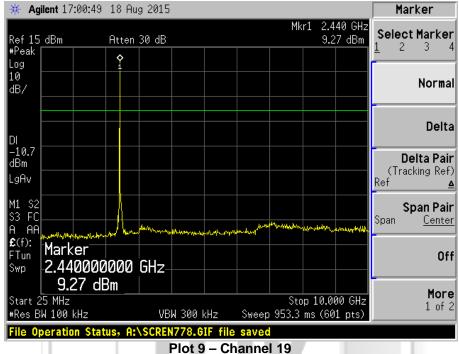
Plot 7 – Channel 0



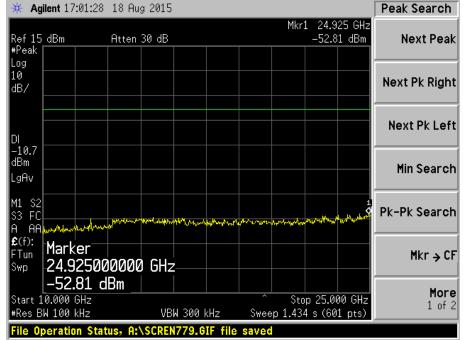
Plot 8 - Channel 0



RF CONDUCTED SPURIOUS EMISSIONS (NON-RESTRICTED BANDS) TEST



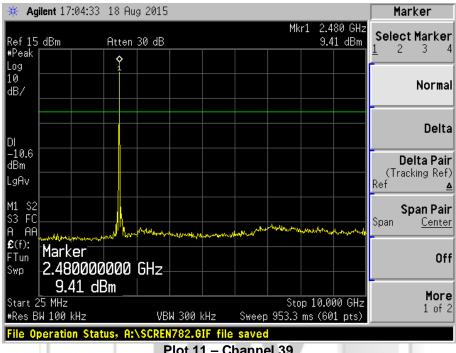
Plot 9 – Channel 19



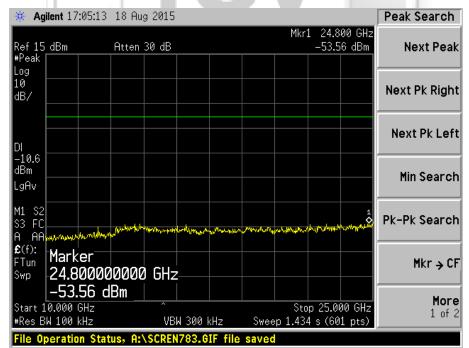
Plot 10 - Channel 19



RF CONDUCTED SPURIOUS EMISSIONS (NON-RESTRICTED BANDS) TEST



Plot 11 - Channel 39



Plot 12 - Channel 39



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST

47 CFR FCC Part 15.205 and RSS-GEN 8.10 Restricted Bands

N	ИHz			MHz			MHz			GHz	
0.090	-	0.110	16.42	-	16.423	399.9	-	410	4.5	-	5.15
0.495	-	0.505	16.69475	-	16.69525	608	-	614	5.35	-	5.46
2.1735	-	2.1905	16.80425	-	16.80475	960	-	1240	7.25	-	7.75
4.125	-	4.128	25.5	-	25.67	1300	-	1427	8.025	-	8.5
4.17725	-	4.17775	37.5	-	38.25	1435	-	1626.5	9.0	-	9.2
4.20725	-	4.20775	73	-	74.6	1645.5	-	1646.5	9.3	-	9.5
6.215	-	6.218	74.8	-	75.2	1660	-	1710	10.6	-	12.7
6.26775	-	6.26825	108	-	121.94	1718.8	-	1722.2	13.25	-	13.4
6.31175	-	6.31225	123	-	138	2200	-	2300	14.47	-	14.5
8.291	-	8.294	149.9	_	150.05	2310	-	2390	15.35	-	16.2
8.362	-	8.366	156.52475	1-	156.52525	2483.5	h	2500	17.7	-	21.4
8.37625	-	8.38675	156.7	-	156.9	2690	2	2900	22.01	-	23.12
8.41425	-	8.41475	162.0125	-	167.17	3260	1	3267	23.6	-	24.0
12.29	-	12.293	167.72	-	173.2	3332	-	3339	31.2	-	31.8
12.51975	-	12.52025	240	- 1	285	3345.8	-	3358	36.43	-	36.5
12.57675	-	12.57725	322	-/	335.4	3600	-	4400	Ab	ove 38	3.6
13.36	-	13.41		11							

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Restricted Bands) Limits

The EUT shows compliance to the requirements of this section, which states that emissions which fall in the restricted bands must comply with the radiated emission limits specified in the table below:

Frequency Range (MHz)	EIRP (dBm)	Radiated Emissions (dBµV/m)						
0.009 - 0.490	-6.7 – (-41.4) **	67.6 – 20logF* @ 300m **						
0.490 - 1.705	-41.4 – (-52.3) **	87.6 – 20logF* @ 30m **						
1.705 – 30	-45.7	29.5 @ 30m						
30 - 88	-55.2	40.0 @ 3m						
88 - 216	-51.7	43.5 @ 3m						
216 - 960	-49.2	46.0 @ 3m						
>960	-41.2 ***	54.0 @ 3m ***						
* F is frequency in kHz.	* F is frequency in kHz.							
** Decreasing linearly with the logarithm of the frequency.								
*** Above 1GHz, a peak limit of 20dB above the average limit does apply.								

<u>47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Restricted Bands)</u> <u>Test Instrumentation</u>

Instrument	Model	S/No	Cal Due Date	Cal Interval
Agilent Spectrum Analyzer	E4440A	MY45304764	12 Dec 2015	1 year
Micro-tronics Bandstop Filter (2.4GHz)	BRM50701-02	007	13 Aug 2016	1 year



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Restricted Bands) Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- 2. The power supply for the EUT was connected to a filtered mains.
- 3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
- 4. The resolution bandwidth (RBW) of the spectrum analyser was set to the following settings. The video bandwidth (VBW) was set to at least three times of the RBW.

Frequency (MHz)	RBW (kHz)	
0.009 - 0.150	0.2	
0.150 - 30.0	9.0	
30.0 - 1000	100.0	
> 1000	1000.0	

- 5. The detector of the spectrum analyser was set to peak detection mode.
- 6. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Restricted Bands) Test Method

- 1. Measurement in the range 9kHz 1000MHz
- 1.1 The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, with the transmitting frequency was set to lower channel.
- 1.2 The start and stop frequencies of the spectrum analyser were set according to the supported RBW.
- 1.3 The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
- 1.4 No further measurement was required if all the captured emissions complied to the limits. Else, the spectrum analyser was set to zoom to the captured emission with the detector of the spectrum analyser was set to quasi-peak. The emission level of the captured frequency was measured.
- 1.5 The step 1.4 was repeated until all the captured emissions which exceeding the limits were measured.
- 1.6 The steps 1.2 to 1.5 were repeated with the transmitting frequency was set to middle and upper channel respectively.
- 2. <u>Measurement above 1000MHz</u>
- 2.1 The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, with the transmitting frequency was set to lower channel.
- 2.2 The start and stop frequencies of the spectrum analyser were set according to the supported frequency band of the set RBW with the number of points in a sweep was set to equal or greater than 2 times of the ratio of span over RBW.
- 2.3 The detector of the spectrum analyser was set to power average (RMS) mode with the sweep time was set to equal or greater than 10 times of the product of number of measurement points in a sweep and transmission symbol time.
- 2.4 The spectrum analyser was then allowed to capture any spurious emissions within a single sweep. The peak marker function of the spectrum analyser was used to locate the highest power level.
- 2.5 The steps 2.2 to 2.4 were repeated until all the required frequency bands were measured.
- 2.6 The steps 2.2 to 2.5 were repeated with the transmitting frequency was set to middle and upper channel respectively.
- 2.7 The measurements were repeated with the detector of the spectrum analyser was set to peak detecting mode. The sweep time was set to auto coupler.



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 RF Conducted Spurious Emissions (Restricted Bands) Results

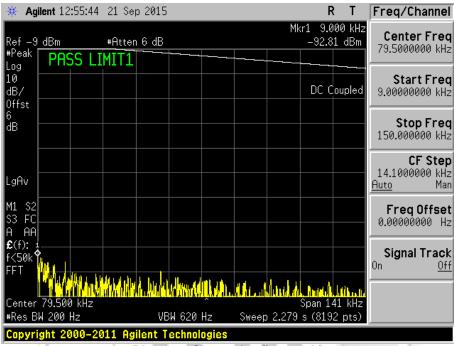
Test Input Power	7.4Vdc	Temperature	24°C
Attached Plots	13 – 30	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Liau Lee Yin

All spurious signals found were below the specified limit. Please refer to the attached plots.

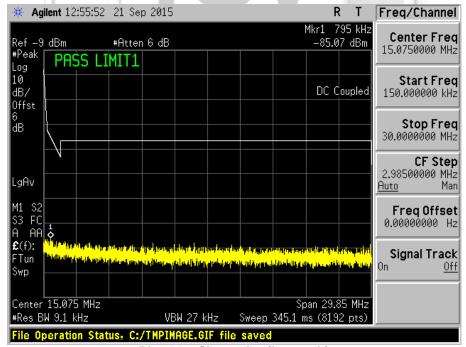




RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



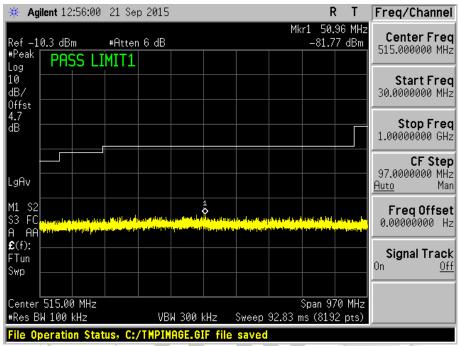
Plot 13 - Channel 0 (lower ch)



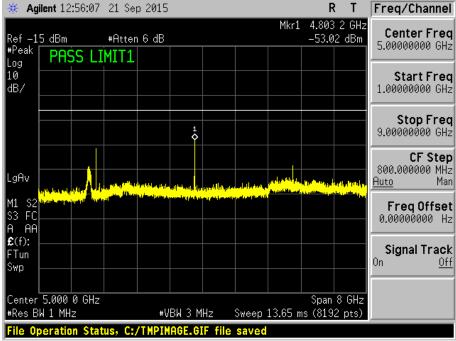
Plot 14 – Channel 0 (lower ch)



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



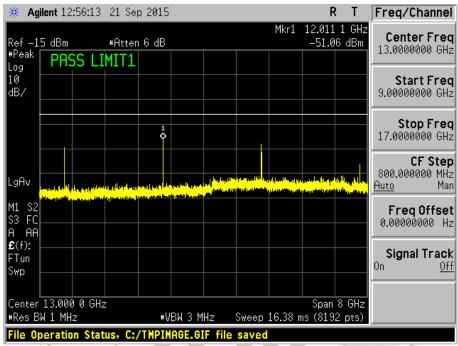
Plot 15 - Channel 0 (lower ch)



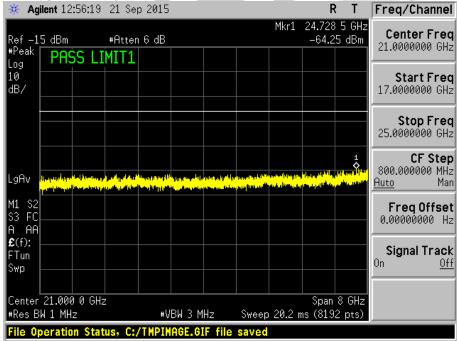
Plot 16 - Channel 0 (lower ch)



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



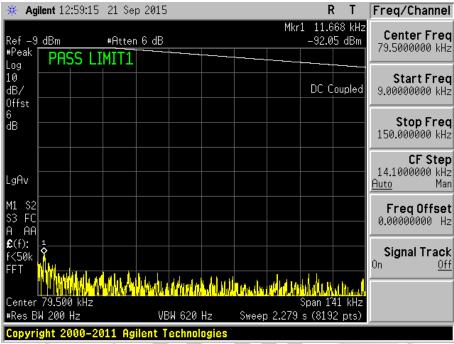
Plot 17 - Channel 0 (lower ch)



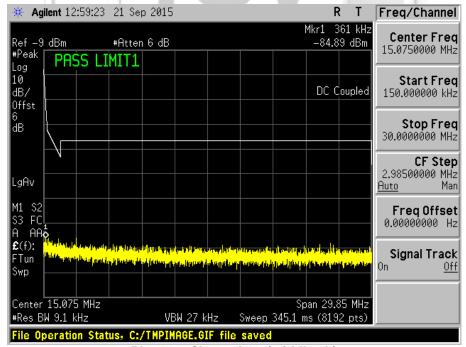
Plot 18 - Channel 0 (lower ch)



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



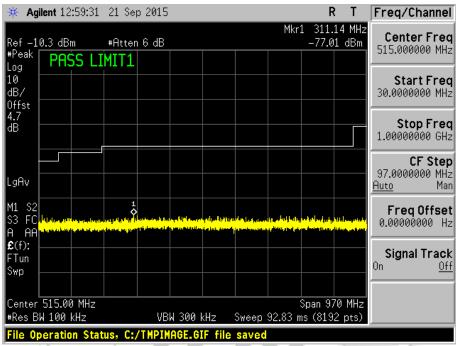
Plot 19 - Channel 19 (middle ch)



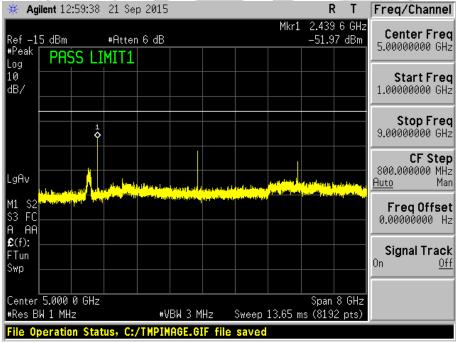
Plot 20 - Channel 19 (middle ch)



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



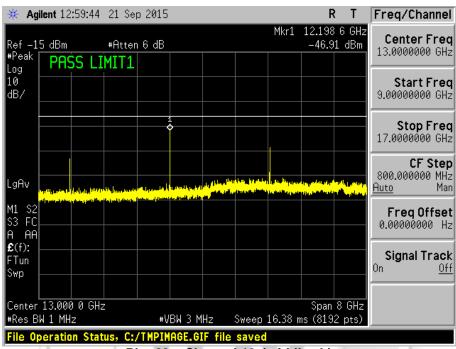
Plot 21 - Channel 19 (middle ch)



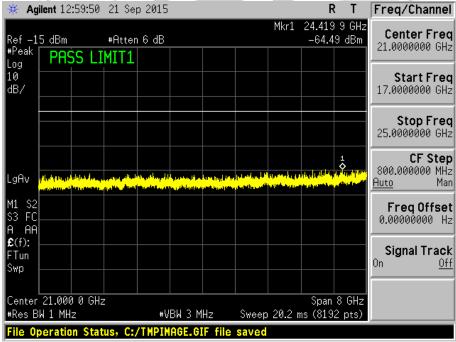
Plot 22 - Channel 19 (middle ch)



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



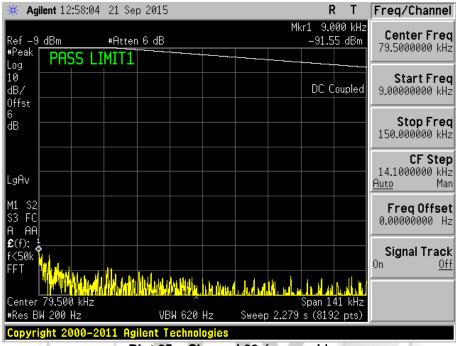
Plot 23 - Channel 19 (middle ch)



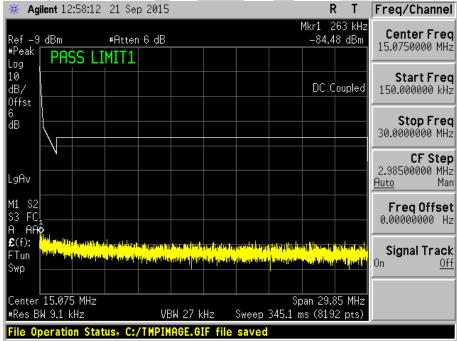
Plot 24 - Channel 19 (middle ch)



RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST



Plot 25 - Channel 39 (upper ch)

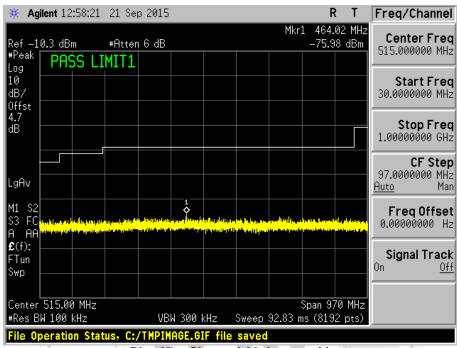


Plot 26 - Channel 39 (upper ch)

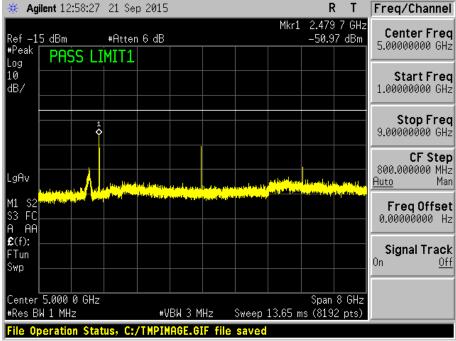


RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST

RF Conducted Spurious Emissions (Restricted) Plots



Plot 27 - Channel 39 (upper ch)

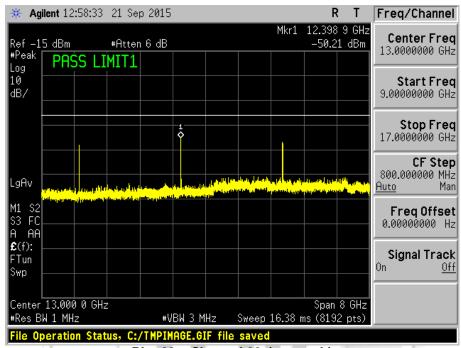


Plot 28 - Channel 39 (upper ch)

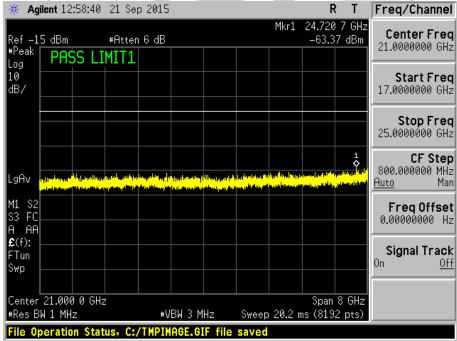


RF CONDUCTED SPURIOUS EMISSIONS (RESTRICTED BANDS) TEST

RF Conducted Spurious Emissions (Restricted) Plots



Plot 29 - Channel 39 (upper ch)



Plot 30 - Channel 39 (upper ch)



BAND EDGE COMPLIANCE (CONDUCTED) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Conducted) Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Conducted) Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
Agilent Spectrum Analyzer	E4404B	US39440632	02 Apr 2016	1 year

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Conducted) Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- 2. The power supply for the EUT was connected to a filtered mains.
- 3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
- 4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
- 5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Conducted) Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode.
- 2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
- 3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
- 4. The steps 2 to 3 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



BAND EDGE COMPLIANCE (CONDUCTED) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Conducted) Results

Test Input Power	7.4Vdc	Temperature	24°C
Attached Plots	31 – 32	Relative Humidity	56%
		Atmospheric Pressure	1030mbar
		Tested By	Liau Lee Yin

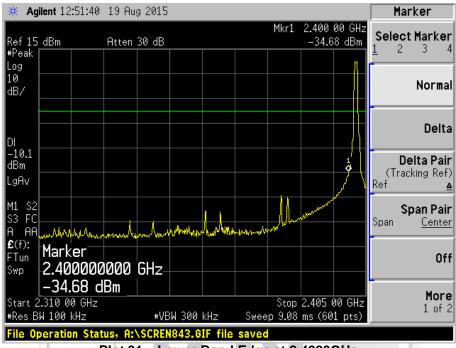
No significant signal was found and they were below the specified limit.



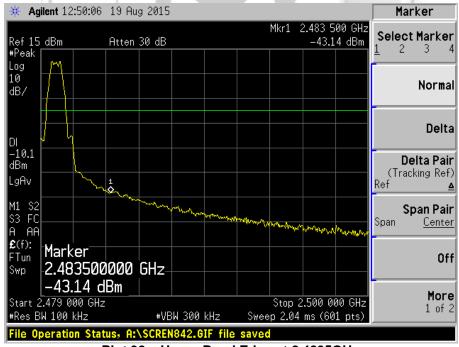


BAND EDGE COMPLIANCE (CONDUCTED) TEST

Band Edge Compliance (Conducted) Plots



Plot 31 - Lower Band Edge at 2.4000GHz



Plot 32 - Upper Band Edge at 2.4835GHz



BAND EDGE COMPLIANCE (RADIATED) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Radiated) Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands shall comply to the radiated emission limits specified in 15.209.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Radiated) Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
R&S Test Receiver – ESI1	ESI40	100010	14 Jul 2016	1 year
EMCO Horn Antenna(1GHz-18GHz)	3115	0003-6088	20 Apr 2016	1 year
R&S Preamplifier (1GHz -18GHz)	SCU18	102191	13 Mar 2016	1 year

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Radiated) Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- The power supply for the EUT was connected to a filtered mains.
- 3. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz to show compliance of spurious at band edges are at least 20dB below the carriers. For restricted band spurious at band edges, peak and average measurement plots were taken using the following setting:
 - a. Peak Plot:
 - RBW = 1MHz, VBW = 3MHz
 - b. Average Plot
 - RBW = 1MHz, VBW = 30Hz
- 4. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Radiated) Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode.
- 2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
- 3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected. For the average measurement, it was done via a video average mode with a reduced VBW.
- 4. The steps 2 to 3 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



BAND EDGE COMPLIANCE (RADIATED) TEST

47 CFR FCC Part 15.247(d) and RSS-247 5.5 Band Edge Compliance (Radiated) Results

Test Input Power	7.4Vdc	Temperature	24°C
Attached Plots	33 – 38	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Dylan Lin

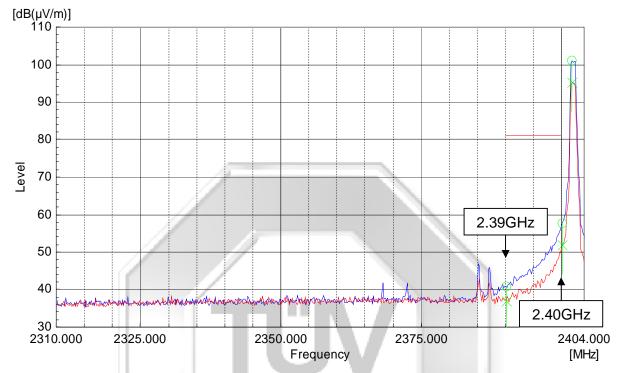
No significant signal was found and they were below the specified limit.



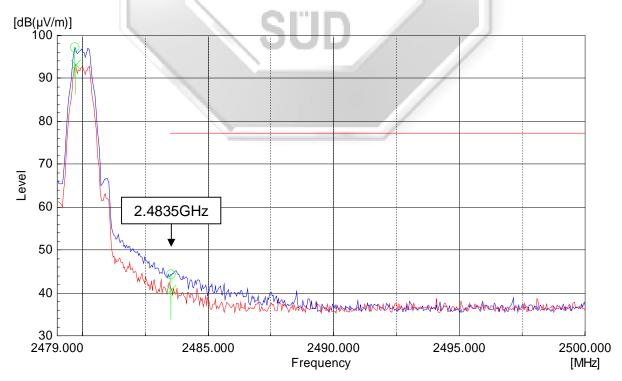


BAND EDGE COMPLIANCE (RADIATED) TEST

Band Edge Compliance (Radiated) Plots (20dB Delta from Carrier at Band Edge)



Plot 33 - Lower Band Edge at 2.4000GHz

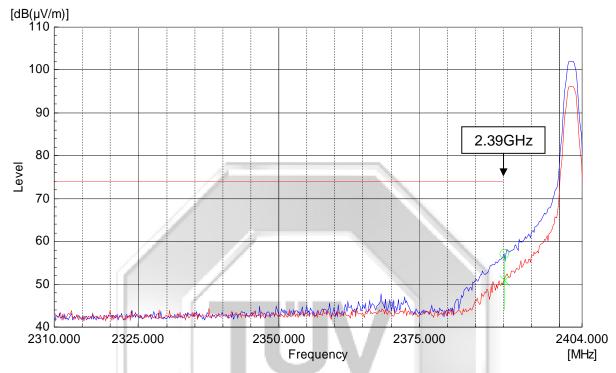


Plot 34 - Upper Band Edge at 2.4835GHz

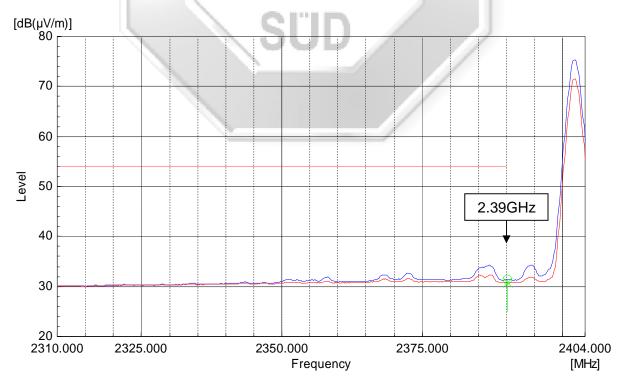


BAND EDGE COMPLIANCE (RADIATED) TEST

Band Edge Compliance (Radiated) Plots (Restricted Band)



Plot 35 - Peak Plot at Lower Band Edge at 2.4000GHz

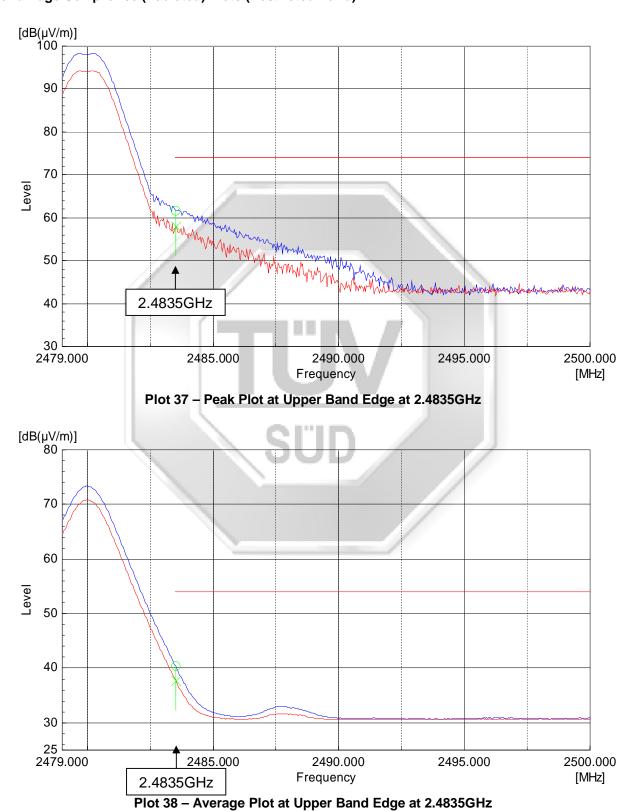


Plot 36 - Average Plot at Lower Band Edge at 2.4000GHz



BAND EDGE COMPLIANCE (RADIATED) TEST

Band Edge Compliance (Radiated) Plots (Restricted Band)





PEAK POWER SPECTRAL DENSITY TEST

47 CFR FCC Part 15.247(e) and RSS-247 5.2(2) Peak Power Spectral Density Limits

The EUT shows compliance to the requirements of this section, which states the peak power spectral density conducted from the intentional radiator (EUT) to the antenna shall not be greater than 8dBm (6.3mW) in any 3kHz band during any time interval of continuous transmission.

47 CFR FCC Part 15.247(e) and RSS-247 5.2(2) Peak Power Spectral Density Test Instrumentation

Instrument	Model	S/No	Cal Due Date	Cal Interval
Agilent Spectrum Analyzer	E4404B	US39440632	02 Apr 2016	1 year

47 CFR FCC Part 15.247(e) and RSS-247 5.2(2) Peak Power Spectral Density Test Setup

- 1. The EUT and supporting equipment were set up as shown in the setup photo.
- 2. The power supply for the EUT was connected to a filtered mains.
- 3. The RF antenna connector was connected to the spectrum via a low-loss coaxial cable.
- 4. The resolution bandwidth (RBW), video bandwidth (VBW) and span of the spectrum analyser were set to the following:

RBW = 3kHz

VBW = 9kHz

Span = 1.5 times the channel bandwidth

Sweep time = auto couple

5. All other supporting equipment were powered separately from another filtered mains.

47 CFR FCC Part 15.247(e) and RSS-247 5.2(2) Peak Power Spectral Density Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode at lower channel.
- 2. The peak of the transmitting frequency was detected with the marker peak function of the spectrum analyser.
- 3. The peak power density of the transmitting frequency was plotted and recorded.
- 4. The steps 2 to 3 were repeated with the transmitting frequency was set to middle and upper channel respectively.



PEAK POWER SPECTRAL DENSITY TEST

47 CFR FCC Part 15.247(e) and RSS-247 5.2(2) Peak Power Spectral Density Results

Test Input Power	7.4Vdc	Temperature	24°C
Attached Plots	39 – 41	Relative Humidity	56%
		Atmospheric Pressure	1030mbar
		Tested By	Liau Lee Yin

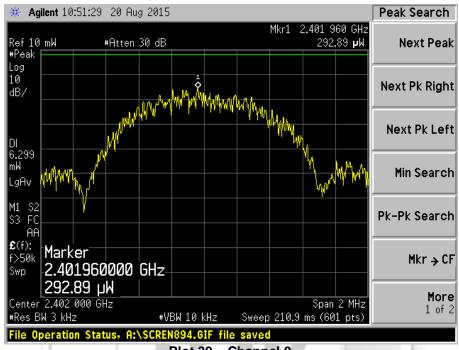
Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)
0	2.402	0.2929	6.3
19	2.440	0.2990	6.3
39	2.480	0.2943	6.3



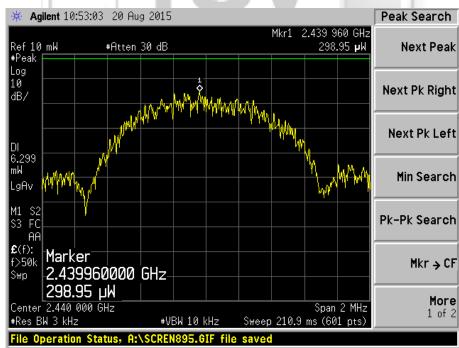


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots



Plot 39 - Channel 0

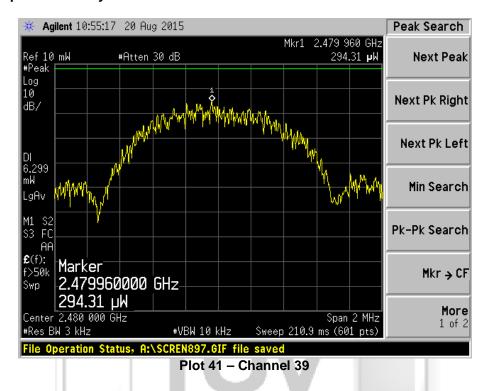


Plot 40 - Channel 19



PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots





Please note that this Report is issued under the following terms :

- 1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.
- 2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.
- 3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.
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- 5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.





ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS

ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS



ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS

TEST SETUP (30MHz to 1GHz)



Radiated Emissions Test Setup (Front View)

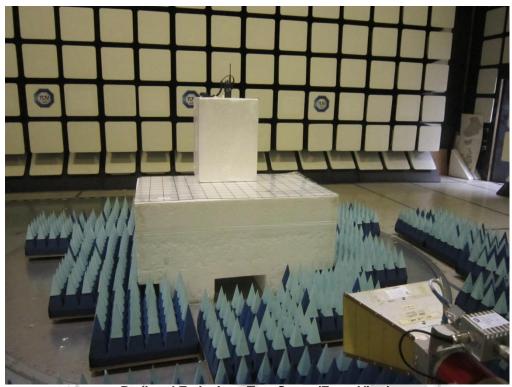


Radiated Emissions Test Setup (Rear View)

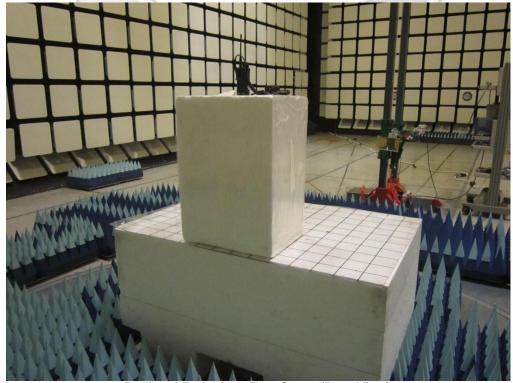


ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS

TEST SETUP (Above 1GHz)



Radiated Emissions Test Setup (Front View)



Radiated Emissions Test Setup (Rear View)



ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS



Spectrum Bandwidth (6dB Bandwidth Measurement) Test Setup



Maximum Peak Power Test Setup



ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS



RF Conducted Spurious Emissions (Non-Restricted Bands) Test Setup



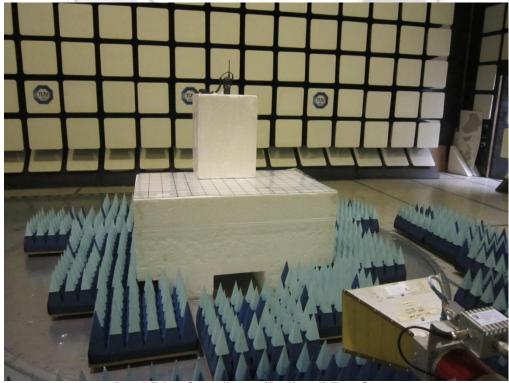
RF Conducted Spurious Emissions (Restricted Bands) Test Setup



ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS



Band Edge Compliance (Conducted) Test Setup



Band Edge Compliance (Radiated) Test Setup



ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS



Peak Power Spectral Density Test Setup





ANNEX A TEST SETUP / EUT PHOTOGRAPHS / DIAGRAMS

EUT PHOTOGRAPHS



Front View



Rear View



ANNEX B USER MANUALTECHNICAL DESCRIPTION BLOCK & CIRCUIT DIAGRAMS

ANNEX B

....

USER MANUAL TECHNICAL DESCRIPTION BLOCK & CIRCUIT DIAGRAMS

(Please refer to manufacturer for details)



ANNEX C FCC, IC LABEL & POSITION





ANNEX C FCC, IC LABEL & POSITION

Labelling requirements per Section 2.925, 15.19 and RSS-GEN 2.1

The label shown will be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.



Physical Location of FCC and IC Label on EUT



ANNEX D TEST SITE DESCRIPTION





ANNEX D TEST SITE DESCRIPTION

Radiated Emission Test Site Description

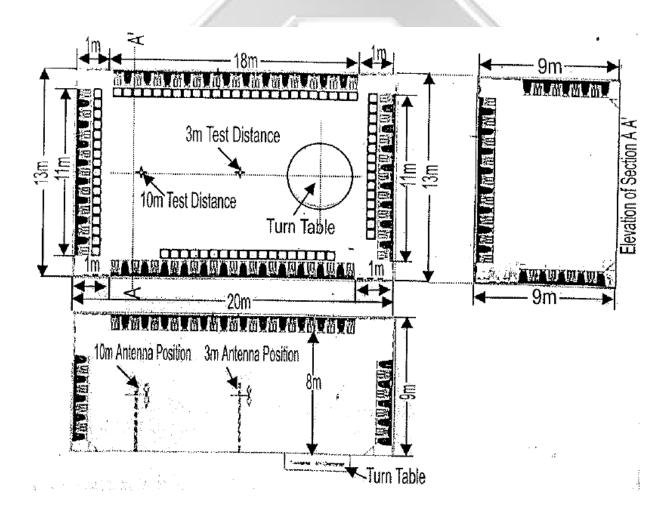
The Radiated Emission test facility consists of a RF-shielded enclosure (Model: 04" x 07") manufactured by Lindgren whose dimensions are shown below. The exterior of the chamber is made of rigid steel panels while the interior is covered with RF absorbing panels on the 4 walls and ceiling. The steel-clad ground place is covered with vinyl flooring.

The turntable is mounted flushed with the chamber floor and is driven by a pneumatic motor, which is capable of supporting 4,000 kg.

The boresight antenna mast is driven by a pneumatic motor with heights variation from 1m- 4m for both vertical and horizontal polarity and with tilt capability.

Both turntable and antenna mast in the chamber are controlled by the controller stationed outside the chamber.

The physical layout of the chamber is show below:





ANNEX D TEST SITE DESCRIPTION

Conducted Emission Test Site Description

The Conducted Emission facility consists of an RF-shielded enclosure measuring 4.3m x 3.7m x 2.45m manufactured by Universal Shielding Corporation. The Conducted Emission data were taken using two LISNs.

The physical layout of the test site is show below:

